SECTION 4

Environmental Consequences

This section describes the beneficial and adverse social, economic, and environmental effects of the project alternatives and mitigation measures that would minimize harm. The information herein is intended to allow the reader to compare the environmental and socioeconomic effects of the project alternatives, including the No-Action Alternative (Baseline), the IL 53 Freeway/Tollway Alternative, and the IL 83/US 45 with US 12 Alternative.

The assessment of environmental consequences presented is based on the latest refinements to the project alternatives. The finalist alternatives were developed at a conceptual level of detail using typical cross-sectional templates (Section 3, *Alternatives*). This detail is sufficient to compare the relative environmental consequences of alternatives. Future phases of work for the preferred alternative would include the necessary detailed engineering to support construction of the facility. During these phases, detailed environmental analyses would be performed. It is also anticipated that further consideration would be given to avoiding and minimizing the environmental consequences discussed in this section.

The resource evaluations in this section relied upon existing and available data, as well as data derived from field reconnaissance for the areas affected by the alternatives. Field verification and enhancement of existing data were undertaken for selected resources (e.g., wetlands, park boundaries, cultural resources, buildings) in an effort to refine data obtained from resource agencies. Field verification of data, however, was not conducted for improvements under the No-Action Alternative (Baseline). The No-Action Alternative (Baseline) is common to both build alternatives, and so the effort required to gather the additional detail would not aid in the differentiation of the environmental consequences between build alternatives. The evaluation of the No-Action Alternative (Baseline) addresses all the resource issues but relies on existing and available data only.

The environmental consequences are presented individually for each alternative (roadway improvements only). The environmental effects of the supporting transportation improvements (e.g., transit, transportation centers) are not considered in this evaluation. Such improvements would be common to the build alternatives, so they would provide no distinguishing measure of effect for the alternatives under consideration.

4.1 Socioeconomic Impacts

4.1.1 Population and Households

The LCTIP took considerable steps to define the impacts of transportation improvements on future population and employment growth. The methodology used for this analysis was endorsed by the Northeastern Illinois Planning Commission (NIPC). These population forecasts show that Lake County is growing despite a lack of major transportation improvements; 280,000 more people are estimated to be in Lake County by 2020 under the No-Action scenario.

Each project alternative would result in slightly different population and household forecasts in 2020. Table 4-1 (on the following page) illustrates the population and household change associated with each alternative, including implementation of the supporting transportation improvements (i.e., rail and bus). There is not a wide range of difference in the forecast population or number of households between the three alternatives—less than a 4 percent difference in population (3.7 percent for the IL 53 Freeway/Tollway Alternative, and 2.5 percent for the IL 83/US 45 with US 12 Alternative), and less than 4 percent difference in the number of

households (3.8 percent for the IL 53 Freeway/Tollway Alternative, and 2.6 percent for the IL 83/US 45 with US 12 Alternative).

Taking a closer look at the population change associated with just the roadway improvements of each alternative, the IL 53 Freeway/Tollway Alternative would contribute 3.4 percent overall (27,500 residents), and the IL 83/US 45 with US 12 Alternative would contribute 2.2 percent overall (18,000 residents; see Figure 4-1). All the forecasts show major population growth in the central and western parts of the county. Further breakdown of these forecasts by township for each alternative is provided below and in Figure 4-2. Figure 4-3 illustrates the change in number of households (by township) for each alternative.

4.1.1.1 No-Action Alternative (Baseline)

Under the No-Action Alternative (Baseline), 2020 population is forecast to increase by 54 percent over the 1990 population of 516,418 to 796,942 (ACG 1999); 2020 households are forecast to increase 67 percent over 1990 households of 173,966 to 290,570 (ACG 1999). Ten townships would experience an increase of more than 75 percent in the number of new residents and households (Fremont, Lake Villa, Wauconda, Antioch, Newport, Warren, Grant, Avon, and Cuba townships), predominantly in western and central Lake County. The forecast growth extends well-established trends in the central and western parts of the county. Growth can be attributed to a number of factors, including community desires for population and economic growth, available land, reasonable land prices, and aesthetic factors (Table 4-2, on the following page). Figure 4-4 illustrates the change in population from 1990 to 2020 by NIPC analysis zone.

4.1.1.2 IL 53 Freeway/Tollway Alternative

Under the IL 53 Freeway/Tollway Alternative, 2020 population in Lake County would increase by 29,339,[1] or 3.7 percent over the No-Action Alternative (Baseline) (from 796,942 to 826,281); number of households would increase by 10,962, or 3.8 percent (from 290,570 to 301,532). The greatest population and household increases from 1990 levels

TABLE 4-1
Forecast Population and Household Growth for Each Alternative
(includes contribution of supporting transportation improvements, such as rail, bus)

Alternative	Population		Households	
	2020 Forecast	% Change	2020 Forecast	% Change
No-Action	796,942	—	290,570	—
IL 53 Freeway/Tollway	29,339 [a]	3.7	10,962 [b]	3.8
IL 53 Freeway/Tollway (roadway improvements only)	27,500	3.4	—	—
IL 83/US 45 with US 12	19,968 [a]	2.5	7,639 [b]	2.6
IL 83/US 45 with US 12 (roadway improvements only)	18,000	2.2	—	—

[a] Projected population increase from No-Action Alternative (Baseline). The population increase attributed to the roadway improvements is 27,500 for the IL 53 Freeway/Tollway Alternative and 18,000 for IL 83/US 45 with US 12 Alternative. The remainder—2,000 people—is attributed to Elgin, Joliet, and Eastern commuter rail improvement.
[b] Projected household increase from the No-Action Alternative (Baseline).
Source: ACG 1999; CATS 1997a; ACG 2000

[1] Includes the population effect of both the roadway and transit (EJ&E) improvements.

generally would occur in the same townships as the No-Action Alternative (Baseline) (Table 4-3, on the following page). Looking at the change between this alternative and No-Action, additional population growth would occur in the central townships of Fremont and Warren, and Shields Township along the northern shore under this alternative. Fremont Township would experience 14.7 percent of the additional growth, Warren Township 11.2 percent, and Shields Township 10.7 percent. Figure 4-5 illustrates the 2020 population effects of the IL 53 Freeway/Tollway Alternative by NIPC analysis zones.

4.1.1.3 IL 83/US 45 with US 12 Alternative

Under the IL 83/US 45 with US 12 Alternative, 2020 population is forecast to increase by an additional 19,968,[2] or 2.5 percent over the No-Action Alternative (Baseline) (from 796,942 to 816,910); households are forecast to increase 2.6 percent over the No-Action Alternative (Baseline) (from 290,570 to 298,209). The greatest

TABLE 4-2
Population and Household Forecasts: No-Action Alternative (Baseline)

Township	Population				Households			
	1990 Census	2020 Forecast	Change from 1990	% Change	1990 Census	2020 Forecast	Change from 1990	% Change
Antioch	18,046	37,571	19,525	108.2	6,846	14,961	8,115	118.5
Avon	35,989	65,780	29,791	82.8	11,846	24,103	12,257	103.5
Benton-Zion	35,590	49,427	13,837	38.9	11,888	17,578	5,690	47.9
Cuba	14,118	24,690	10,572	74.9	5,128	9,681	4,553	88.8
Deerfield-W. Deerfield	64,394	73,270	8,876	13.8	22,315	27,801	5,486	24.6
Ela	32,433	47,491	15,058	46.4	10,161	16,031	5,870	57.8
Fremont	14,280	43,069	28,789	201.6	4,699	15,599	10,900	232.0
Grant	14,423	26,388	11,965	83.0	5,465	10,687	5,222	95.6
Lake Villa	20,764	48,482	27,718	133.5	6,818	17,482	10,664	156.4
Libertyville	42,436	61,721	19,285	45.4	14,874	23,409	8,535	57.4
Newport	3,561	7,320	3,759	105.6	1,169	2,605	1,436	122.8
Shields	43,414	60,134	16,720	38.5	9,930	13,480	3,550	35.8
Vernon	51,141	68,087	16,946	33.1	17,571	25,459	7,888	44.9
Warren	34,785	71,030	36,245	104.2	13,049	28,715	15,666	120.1
Wauconda	12,859	27,474	14,615	113.7	4,610	10,821	6,211	134.7
Waukegan	78,185	85,008	6,823	8.7	27,597	32,160	4,563	16.5
Total	**516,418**	**796,942**	**280,524**	**54.3**	**173,966**	**290,570**	**116,604**	**67.0**

Sources: NIPC 1990; ACG 1999 (Note: Township values are rounded)

[2]Includes the population effect of both roadway and transit (EJ&E) improvements.

population and household increases from 1990 levels generally would occur in the same townships as the No-Action Alternative (Baseline) (Table 4-4, on the following page). Looking at the change between this alternative and the No-Action Alternative (Baseline), additional population growth would occur in the central townships of Warren and Fremont, and Newport Township to the north. Warren Township would experience 11.8 percent of the additional growth, Fremont Township 6.1 percent, and Newport Township 5.7 percent. Figure 4-6 illustrates the population effects of the IL 83/US 45 with US 12 Alternative by NIPC analysis zones.

4.1.2 Community and Land Use Changes

Carefully planned roadway improvements can foster beneficial results, such as making the community more cohesive and serving future growth and planning policies. Lack of planning for roadway improvements can bring undesirable effects to a community, including fracturing community cohesion. The discussion below describes the potential effects of each alternative on community cohesion and developable lands.

4.1.2.1 No-Action Alternative (Baseline)

Under the No-Action Alternative (Baseline), improvements would traverse 30 communities within Lake County (Figure 4-7). Generally,

TABLE 4-3
Population and Household Forecasts, IL 53 Freeway/Tollway Alternative Change from No-Action Alternative (Baseline) (includes contribution of supporting transportation improvements such as rail, bus)

Township	Population				Households			
	1990 Census	2020 Forecast	Change from No-Action	% Change	1990 Census	2020 Forecast	Change from No-Action	% Change
Antioch	18,046	39,007	1,436	3.8	6,846	15,682	721	4.8
Avon	35,989	68,108	2,328	3.5	11,846	25,232	1,129	4.7
Benton-Zion	35,590	51,587	2,160	4.4	11,888	18,479	901	5.1
Cuba	14,118	22,413	(2,277)	(9.2)	5,128	8,750	(931)	(9.6)
Deerfield-W. Deerfield	64,394	74,038	768	1.0	22,315	27,956	155	0.6
Ela	32,433	45,133	(2,358)	(5.0)	10,161	15,255	(775)	(4.8)
Fremont	14,280	49,418	6,350	14.7	4,699	18,018	2,419	15.5
Grant	14,423	26,543	155	0.6	5,465	10,912	225	2.1
Lake Villa	20,764	50,648	2,166	4.5	6,818	18,303	821	4.7
Libertyville	42,436	61,969	247	0.4	14,874	23,775	366	1.6
Newport	3,561	7,736	416	5.7	1,169	2,792	187	7.2
Shields	43,414	66,553	6,419	10.7	9,930	14,495	1,015	7.5
Vernon	51,141	69,059	972	1.4	17,571	25,824	365	1.4
Warren	34,785	78,986	7,956	11.2	13,049	32,325	3,611	12.6
Wauconda	12,859	27,636	162	0.6	4,610	10,891	70	0.6
Waukegan	78,185	87,446	2,438	2.9	27,597	32,844	684	2.1
Total	**516,418**	**826,281**	**29,339**	**3.7**	**173,966**	**301,532**	**10,962**	**3.8**

Sources: NIPC 1990; CATS 1997a (Note: Township values are rounded)

the No-Action Alternative (Baseline) maintains the present roadway network and would not affect community or neighborhood function. The existing roadway network would continue to define the circulation path for entering, leaving, and traveling within the communities. The edge of the roadway improvements would encroach on adjacent properties and in some cases would result in building displacement. The displacements would be scattered throughout the county; therefore, no substantive change in the character of community building stock would occur. Road widening typically would maintain property access, but barrier medians would be installed as part of many roadway improvements, requiring access to be consolidated for some properties. For larger combined driveways and cross streets, a break in the median would be provided to allow left-turn access.

The relation of transportation improvements to land use has been the topic of countless research studies over the years. To determine how this alternative may influence land use decisions, the availability of developable lands (primarily agricultural lands) within 0.8 km (0.5 mi) of the improvements was used as an indicator of the potential for shifting growth. Properties directly adjacent to the proposed improvements are already 62 percent developed, but 2,580 ha (6,375 ac) of land within 0.8 km (0.5 mi) of the improvements are undeveloped and potentially vulnerable to development. Development in the vicinity of the No-Action Alternative (Baseline) is occurring at a rapid pace. In the last 4 years,

TABLE 4-4
Population and Household Forecasts, IL 83/US 45 with US 12 Alternative Change from No-Action Alternative (Baseline) (includes contribution of supporting transportation improvements, such as rail, bus)

Township	Population				Households			
	1990 Census	2020 Forecast	Change from No-Action	% Change	1990 Census	2020 Forecast	Change from No-Action	% Change
Antioch	18,046	38,073	502	1.3	6,846	15,165	204	1.4
Avon	35,989	66,907	1,127	1.7	11,846	24,563	460	1.9
Benton-Zion	35,590	50,930	1,503	3.0	11,888	18,121	542	3.1
Cuba	14,118	24,653	(37)	(0.2)	5,128	9,666	(15)	(0.2)
Deerfield-W. Deerfield	64,394	73,207	(63)	(0.1)	22,315	27,792	(9)	0.0
Ela	32,433	47,858	366	0.8	10,161	16,153	122	0.8
Fremont	14,280	45,702	2,634	6.1	4,699	16,560	962	6.2
Grant	14,423	26,447	60	0.2	5,465	10,743	56	0.5
Lake Villa	20,764	49,200	719	1.5	6,818	17,749	267	1.5
Libertyville	42,436	61,982	261	0.4	14,874	23,603	195	0.8
Newport	3,561	7,738	4187	5.7	1,169	2,755	150	5.8
Shields	43,414	62,051	1,918	3.2	9,930	13,925	445	3.3
Vernon	51,141	68,840	753	1.1	17,571	25,761	303	1.2
Warren	34,785	79,403	8,373	11.8	13,049	32,126	3,411	11.9
Wauconda	12,859	27,474	0	0.0	4,610	10,821	0	0.0
Waukegan	78,185	86,444	1,436	1.7	27,597	32,705	554	1.7
Total	**516,418**	**816,910**	**19,968**	**2.5**	**173,966**	**298,209**	**7,640**	**2.6**

Source: NIPC 1990; ACG 2000 (Note: Township values are rounded)

344 ha (850 ac) of vacant land have been converted to development, representing a loss of about 1.4 percent of undeveloped land near the alternative improvements. Development patterns also show that 99 percent of the undeveloped land in the No-Action influence zone is already bounded by development of more than 50 percent. This strongly suggests that most of the open lands near the No-Action Alternative (Baseline) are vulnerable to development for various reasons, including transportation improvements, and would not be sustainable over the long term without restrictive land use policies or outright purchase of development rights.

4.1.2.2 IL 53 Freeway/Tollway Alternative

This alternative would traverse 15 communities (Figure 4-8). The proposal to extend IL 53 north and upgrade IL 120 has been part of the region's long-range transportation plan since 1960; therefore, many communities nearby have had the opportunity to consider and plan for compatible land uses adjacent to the proposed facility. The proposed alignment avoids community centers that have an established sense of place and character. Most of the alignment runs through areas characterized as large lot residential development, particularly the north-south segment of the alternative. The alignment generally skirts established subdivisions; however, in one case the alignment bisects several developments in the Mundelein area. The right-of-way for the corridor was purchased prior to the full build out of these subdivisions, which has preserved and delineated the roadway footprint. Nonetheless, perceived loss of neighborhood cohesion is likely if the roadway is constructed.

A major transportation facility, such as the IL 53 Freeway/Tollway Alternative, represents a major new element for some communities in central Lake County. New highway facilities always raise the question of fit. In cases where properties are already developed adjacent to the proposed improvement, facility design considerations could be developed to protect these areas from typical highway related concerns (i.e., noise and visual concerns). Design considerations could include noise barriers, landscaping, landscape berms, buffer areas, and roadway lighting sensitive to adjacent land uses. In cases where adjacent lands are undeveloped, additional care should be exercised in planning and zoning to provide for land use patterns that best coincide with a major transportation facility. This could include locating the most traffic intensive uses near the corridor or at interchange locations, while the suburban land uses would extend away from the corridor. With well-managed land use policy and plans, this alternative could advantageously address existing development with sensitive design and accommodate growth with quality development.

About 35 percent of the land directly adjacent to the IL 53 Freeway/Tollway Alternative is developed. Within 0.8 km (0.5 mi) of these improvements, there are 2,469 ha (6,100 ac) of undeveloped land. About 10 percent of these lands are bounded by development by less than 50 percent and have the potential to be sustained as open land over the long term. The IL 53 Freeway/Tollway Alternative is completely within municipal planning boundaries. Similar to the No-Action Alternative (Baseline), the remaining open lands would be vulnerable to development for various reasons other than transportation and would not be sustainable in the future without restrictive land use policies or outright purchase of development rights.

Another impact commonly associated with a new highway is the establishment of new borders that tend to define community or neighborhood edges. The perception of a barrier, however, would not alter travel patterns on state, county, and town roads within the communities. The circulation patterns on the roadway system would be virtually unchanged for vehicles, bicycles, pedestrians, emergency services, and school bus routes. Major crossing routes would be served with an interchange, and secondary routes would cross over or under the new facility. Therefore, the existing roadway

connectivity would still be present under this alternative. In some instances, a few minor roads would be terminated to through travel at the new roadway. Some minor inconveniences in access would occur at the neighborhood level, but in all cases the amount of adverse travel would be insignificant. Crossing road improvements are planned at all the major interchange locations. These improvements may alter access to businesses and homes near the interchange, permitting right-in and right-out turning movements only.

Changes in accessibility can cause advantages and disadvantages. Advantages are conferred to parcels of land near interchanges, which "create unique accessibility and exposure advantages" for sites at interchanges (Downs 1969). The IL 53 Freeway/Tollway Alternative would be designed as an access-controlled facility with interchanges at major crossing roads. Areas near planned interchanges would become more valuable for development because of improved access and visibility (Downs 1969). This alternative would include 12 new interchanges, including Lake-Cook Road, IL 22, Midlothian Road, Peterson Road, US 45, Hunt Club Road, Milwaukee Avenue, I-94, O'Plaine Road, Alleghany Road, Fairfield Road, and Wilson Road. In each case, local municipalities have zoning that applies to the interchange locations. The predominant zoned land use is residential, which reflects current land use policy.

4.1.2.3 IL 83/US 45 with US 12 Alternative

This alternative would be routed through 21 communities (Figure 4-9). The improvements would be on both existing and new alignment. The improvements following existing routes typically would have a 6-lane cross-section that would require considerable displacement of residential and commercial structures. The existing character of these corridors can be expected to change with greater build-out of development or different land uses than already exists.

The IL 83/US 45 with US 12 Alternative would cause only minor changes to property access along the improved routes. Over 70 percent of the improved routes would be on existing roadways, and current property access would be generally provided with some modifications including consolidating ingress and egress in areas of concentrated development and at intersections. Most major roadway intersections would be at-grade intersections with the exception of a new interchange at IL 83 and IL 22. Intersections would be upgraded to accommodate high volume turning movements. To maintain efficient traffic movement and operations at the intersections, access control to nearby properties would be required consisting of limiting the number of ingress and egress points, and limiting turning movements to right-in and right-out.

The IL 83/US 45 with US 12 Alternative has 2,019 ha (4,990 ac) of undeveloped land within 0.8 km (0.5 mi) of the improvements. Because this alternative largely involves improvements to existing facilities there is a substantial amount of existing development (about 56 percent) directly adjacent to the proposed improvements. Similarly, most of the developable lands (97 percent) within 0.8 km (0.5 mi) of the improvements are already surrounded by development, and would be vulnerable to future development for a variety of reasons. It would be unlikely that these open lands would be sustainable without aggressive land use policies or outright purchase of development rights.

Bypasses were incorporated along US 45, IL 21, IL 60, and IL 120 to avoid community impacts to downtown Mundelein, downtown Libertyville, through the Diamond Lake area (a residential area), and through a commercial corridor in Grayslake. In all four of these locations, through-town improvements were determined to be unfeasible because of the disruption and change in character to the areas that widening would cause. Bypasses were selected that minimized displacements, while providing additional capacity to the system and helping to relieve congestion on parallel existing routes. The Mundelein bypass would share the same alignment as the IL 53 Freeway/Tollway Alternative north of IL 60. This area is characterized by large scattered

subdivisions, some of which would be traversed by the bypass. Other subdivisions north of this point would be traversed by the facility causing proximity impacts. A subdivision near the intersection of Diamond Lake Road and IL 83 would also be traversed by the Mundelein bypass, requiring the displacement of many residences. The proximity of the facility to the neighborhood would cause impacts that would be addressed with facility design considerations. Another bypass is proposed around the downtown center of Libertyville and would be routed along St. Mary's road. The proposal includes widening St. Mary's road to a 4-lane facility (currently 2 lanes). This roadway improvement would encroach upon adjacent properties and in a few cases would require building displacements. The extent of the improvements, however, would not materially alter the expansive front yards characteristic of most residences. The presence of a wider roadway footprint in this area would result in the roadway being a more prominent feature in the neighborhood landscape, but neighborhood cohesion would be unaffected—the presence of a wider road would not change the functional interactions that occur in the corridor. A bypass of Grayslake would traverse several subdivisions that were laid out in recognition of a future roadway.

4.1.3 Residential Relocations

4.1.3.1 No-Action Alternative (Baseline)

Sixty-seven residences would be displaced under the No-Action Alternative (Baseline) (Figure 4-10). Based on the 2020 No-Action Alternative (Baseline) forecast, average household size of 2.74 in Lake County (derived from the No-Action Alternative (Baseline) 2020 population and household forecasts), 184 residents would be relocated.

4.1.3.2 IL 53 Freeway/Tollway Alternative

One hundred thirteen residences and 45 ancillary buildings (garages, sheds, etc.) would be displaced as a result of the IL 53 Freeway/Tollway Alternative (Figure 4-11). Of the residences affected, 85 buildings would be single-family homes and 28 units would be in multi-family structures. Most of the multi-family impact occurs at Bourbon Square Townhouses, located near IL 53, south of Lake-Cook Road in Palatine.

Most of the residences to be displaced would be owner-occupied, as 74 percent of all housing in the study area is owner-occupied. There is no shortage of replacement housing across various price ranges in the study area, as evidenced by the residential development that is occurring throughout the area. Based on the 2020 IL 53 Freeway/Tollway Alternative forecast, average household size of 2.74 (derived from the IL 53 Freeway/Tollway Alternative 2020 population and household forecasts), 310 residents would be relocated.

Acquisition, relocation activities, and benefits would comply with provisions of the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended, and both the Illinois Department of Transportation (IDOT) *Land Acquisition Procedures Manual*, or the Illinois State Toll Highway Authority (ISTHA) *Guidelines for the Reimbursement of Costs Incurred in the Displacement of Residences and Businesses.* Relocation resources are available to all relocatees without discrimination.

4.1.3.3 IL 83/US 45 with US 12 Alternative

One hundred eighty-seven residences and 25 ancillary buildings (garages, sheds, etc.) would be displaced as a result of the IL 83/US 45 with US 12 Alternative (Figure 4-12). Of the residences affected, 114 buildings would be single-family homes and 73 units would be in multi-family structures. Most of the multi-family units are along US 12, south of Lake-Cook Road in Palatine. Complexes that would be affected include Turtle Creek Apartments, Port of Call Apartments, Kingsbrooke Townhomes, and Bourbon Square.

Under this alternative, about half of the displaced residences would be rental units and half owner-occupied housing. There is no shortage of replacement housing of either

rental or owner-occupied units across various price ranges in the study area, as evidenced by the residential development occurring throughout the county. Based on the 2020 IL 83/US 45 with US 12 Alternative forecast, average household size of 2.74 in Lake County (derived from the IL 83/US 45 with US 12 Alternative 2020 population and household forecasts), 512 residents would be relocated under this alternative.

Acquisition, relocation activities, and benefits would comply with provisions of the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended, and the IDOT *Land Acquisition Procedures Manual* or the ISTHA *Guidelines for the Reimbursement of Costs Incurred in the Displacement of Residences and Businesses.* Relocation resources are available to all relocatees without discrimination.

Table 4-5 summarizes the anticipated residences and ancillary buildings (garages, sheds, etc.) that would be displaced as a result each alternative.

4.1.4 Business Relocations

4.1.4.1 No-Action Alternative (Baseline)

The No-Action Alternative (Baseline) would displace 23 businesses (Figure 4-10).[3]

4.1.4.2 IL 53 Freeway/Tollway Alternative

The IL 53 Freeway/Tollway Alternative would displace nine businesses (Figure 4-11). These businesses include a mix of commercial, retail and recreational sites (Table 4-6, on the following page). Roughly 178 employees are associated with the displaced businesses, based on business type. Right-of-way would also be required from an additional 32 businesses for this alternative. Although 109 parking spaces would be affected from 6 of the 32 businesses, representing 21 percent of the total parking spaces available at those businesses, there would be replacement parking available on the property or in immediately adjacent areas. Therefore with replacement parking the net impact to parking would be zero.

Certain types of businesses are more sensitive to roadway location than others. Retail businesses and those dependent on accessibility and high visibility are more directly affected by their physical proximity to a roadway. Some retail businesses are likely to develop near interchanges to serve travelers. Others may relocate to interchange areas from other areas in the county. This is often interpreted as growth, but in many instances it amounts only to a redistribution of facilities.

The IL 53 extension provides improved access and mobility to the area that, combined with the appropriate utility infrastructure, could attract business development. The IL 53 Freeway/Tollway Alternative could also cause some minor changes in access for businesses located near cross road improvements. Median barriers and improved intersections would restrict access, possibly requiring right-in,

TABLE 4-5
Residential Relocation Summary

	No-Action	IL 53 Freeway/Tollway	IL 83/US 45 with US 12
Residential Relocations (Additional Ancillary Outbuildings associated with Residential Relocations)	67	113 (45)	187 (25)

[3]No-Action Alternative (Baseline) business displacements were not field verified as for the build alternatives, therefore no additional information is available on these 23 businesses.

right-out access in some locations.

4.1.4.3 IL 83/US 45 with US 12 Alternative

The IL 83/US 45 with US 12 Alternative would displace 113 commercial buildings containing 195 businesses (Figure 4-12). The businesses include a mix of retail (restaurants, hardware stores, and gas stations), commercial office, and industrial (Table 4-7, on the following page). Roughly 3,428 employees associated with the displaced businesses, based on business type.

Although buildings would not be impacted, right-of-way would also be required from an additional 152 businesses along the alignment. Approximately 2,514 parking spaces would be impacted at those businesses. This parking represents 71 percent of the total parking spaces available at those businesses. Most of this parking could be replaced on the property or in immediately adjacent areas. Only 258, or 7.3 percent of the total spaces would be displaced.

Other impacts to businesses both adjacent to and near the proposed improvements could include changes in access to property. Except for improvements to I-94, the IL 83/US 45 with US 12 improvements would result in upgraded arterial facilities (as opposed to a freeway or tollway facility). Barrier medians are assumed along all arterials to be improved, whether 4-lane or 6-lane. Access would be consolidated where possible. For large, combined driveways and cross streets, a break in the median generally would be provided to allow for left-turn access. However, most individual parcels could not be given a median break and would be limited to right-in, right-out access. U-turns would need to be accommodated at many intersections, resulting in adverse travel for property owners and business patrons.

4.1.5 Employment

Figure 4-13 compares the employment increases for the No-Action Alternative (Baseline), IL 53 Freeway/Tollway, and IL 83/US 45 with US 12 Alternatives**.**

4.1.5.1 No-Action Alternative (Baseline)

Under the No-Action Alternative (Baseline), employment is forecast to grow by 160,939 between 1990 and 2020, or 70 percent (Table 4-8, on page 4-12). The greatest employment growth, in terms of increase in the total number of employees, is expected to occur in Vernon, Warren, and Libertyville townships (in central Lake County) as well as in Deerfield and West Deerfield townships,

TABLE 4-6
Displaced Businesses, IL 53 Freeway/Tollway Alternative

Road	Number of Displaced Structures by Business Type	Estimated Number of Employees Associated with the Displaced Business[a]
IL 120	1 equestrian stable	9
IL 120	1 nursery	17
IL 120	1 school bus service	38
IL 120	1 golf driving range	9
IL 53 (feeder)	1 auto sales	21
IL 53	2 retail sale	50
IL 53	2 nurseries	34
Total	**9**	**178**

[a]Source: *Trip Generation Manual* (6th ed.), Institute of Transportation Engineers 1997.

TABLE 4-7

Displaced Businesses, IL 83/US 45 with US 12 Alternative

Road	Number of Displaced Structures by Business Type	Estimated Number of Employees Associated with the Displaced Business*
IL 120 (both mainline and feeder road impacts)	2 retail sales	50
	1 gas station	5
	1 strip mall	50
	1 nursery	17
	1 school bus service	38
	1 church	11
IL 21 (both mainline and feeder road impacts)	8 restaurants	200
	2 banks	32
	3 commercial offices	519
	2 hotels	24
	10 retail sales	250
	1 corner grocery store	10
	2 medical offices	78
	6 gas stations	30
	1 fast food restaurant	20
	2 recreation/cultural center office	18
	2 strip malls	100
IL 83/US 45 (both mainline and feeder road impacts)	5 restaurants	125
	2 banks	32
	2 commercial offices	346
	1 hotels	12
	8 retail sales	200
	1 corner grocery store	10
	2 medical offices	78
	5 gas stations	25
	2 auto repair	10
	5 fast food restaurant	100
	1 nursery	17
	1 auto sales	21
	2 strip malls	100
	2 building materials/storage	28
US 12 (both mainline and feeder road impacts)	6 restaurants	150
	2 commercial offices	346
	1 hotels	12
	3 retail sales	75
	5 gas stations	25
	3 auto repair	15
	1 auto sales	21
	4 strip malls	200
	1 entertainment	14
	2 building materials/storage	14
Total	**113**	**3,428**

*Source: *Trip Generation Manual* (6th ed.), Institute of Transportation Engineers 1997

located southeast Lake County. These townships enjoy good access to I-94 and have been where the majority of employers have located over the past 30 years. In terms of greatest percent increase, Fremont township is forecast to increase by 386 percent (an additional 12,784 employees).

4.1.5.2 IL 53 Freeway/Tollway Alternative

Under the IL 53 Freeway/Tollway Alternative, total employment in Lake County would increase to 393,989, an increase of 165,383 over 1990 levels. This is an increase of 4,444 jobs over the No-Action Alternative (Baseline) (Table 4-9, on the following page). The pattern of new job growth from 1990 conditions is similar to that under the No-Action Alternative (Baseline); Vernon, Warren, Libertyville and Deerfield/West Deerfield townships would see the greatest number of new jobs. Looking at the percent change between this alternative and the No-Action Alternative (Baseline), this alternative would provide additional employment growth in the southern townships of Vernon and Ela, and Fremont township in central Lake County. Vernon township would experience 5.3 percent additional growth, and Fremont and Ela townships would experience 4.5 percent. Figure -14 illustrates the employment effects of the IL 53 Freeway/Tollway Alternative by NIPC analysis zones.

4.1.5.3 IL 83/US 45 with US 12 Alternative

Under the IL 83/US 45 with US 12 Alternative, there would be 393,746 jobs in Lake County in 2020, an increase of 165,040 jobs over 1990 levels (Table 4-10, on the following page). This represents an increase of 4,201 jobs over the No-Action Alternative (Baseline). The pattern of where new job growth would occur from

TABLE 4-8
Employment Forecast, No-Action Alternative (Baseline)

Township	1990	2020 Forecast	Change from 1990	% Change
Antioch	4,561	8,826	4,265	93.5
Avon	8,609	17,354	8,745	101.6
Benton-Zion	6,436	10,721	4,285	66.6
Cuba	9,323	11,224	1,901	20.4
Deerfield-W. Deerfield	34,693	49,946	15,253	44.0
Ela	13,718	24,496	10,778	78.6
Fremont	3,312	16,096	12,784	386.0
Grant	3,688	4,847	1,159	31.4
Lake Villa	2,968	7,622	4,654	156.8
Libertyville	38,021	56,498	18,477	48.6
Newport	966	2,924	1,958	202.7
Shields	20,346	24,250	3,904	19.2
Vernon	28,028	65,924	37,896	135.2
Warren	17,599	42,647	25,048	142.3
Wauconda	4,297	8,974	4,677	108.9
Waukegan	32,041	37,196	5,155	16.1
Total	**228,606**	**389,545**	**160,939**	**70.4**

Sources: NIPC 1990; ACG 1999 (Note: Township values are rounded)

TABLE 4-9
Employment Forecast, IL 53 Freeway/Tollway Alternative

Township	1990 Population	2020 Forecast	Change from No-Action Alternative	% Change
Antioch	4,561	8,395	(431)	(4.9)
Avon	8,609	17,557	203	1.2
Benton-Zion	6,436	10,918	196	1.8
Cuba	9,323	11,606	382	3.4
Deerfield-W. Deerfield	34,693	49,990	44	0.1
Ela	13,718	25,596	1,100	4.5
Fremont	3,312	16,826	730	4.5
Grant	3,688	5,015	169	3.5
Lake Villa	2,968	7,534	(89)	(1.2)
Libertyville	38,021	55,661	(837)	(1.5)
Newport	966	2,927	3	0.1
Shields	20,346	24,173	(77)	(0.3)
Vernon	28,028	69,406	3,482	5.3
Warren	17,599	41,975	(672)	(1.6)
Wauconda	4,297	9,181	207	2.3
Waukegan	32,041	37,229	33	0.1
Total	**228,606**	**393,989**	**4,444**	**1.1**

Sources: NIPC 1990; CATS 1997a (Note: Township values are rounded)

TABLE 4-10
Employment Forecast, IL 83/US 45 with US 12 Alternative

Township	1990 Population	2020 Forecast	Change from No-Action Alternative	% Change
Antioch	4,561	8,718	(108)	(1.2)
Avon	8,609	17,362	8	0.0
Benton-Zion	6,436	10,850	128	1.2
Cuba	9,323	11,574	350	3.1
Deerfield-W. Deerfield	34,693	49,946	0	0.0
Ela	13,718	25,271	775	3.2
Fremont	3,312	16,398	303	1.9
Grant	3,688	4,907	61	1.3
Lake Villa	2,968	7,576	(47)	(0.6)
Libertyville	38,021	57,721	1,222	2.2
Newport	966	2,924	0	0.0
Shields	20,346	24,489	239	1.0
Vernon	28,028	66,309	385	0.6
Warren	17,599	43,467	820	1.9
Wauconda	4,297	9,039	65	0.7
Waukegan	32,041	37,196	0	0.0
Total	**228,606**	**393,746**	**4,200**	**1.1**

Sources: NIPC 1990; ACG 2000 (Note: Township values are rounded)

1990 conditions is similar to that under the No-Action Alternative (Baseline). Vernon, Libertyville, Warren, and Deerfield/West Deerfield townships would see the greatest number of new jobs. Looking at the percent change between this alternative and the No-Action Alternative (Baseline), this alternative would provide additional employment growth in the southern townships of Ela and Cuba. Ela Township would experience 3.2 percent additional growth, and Cuba township would experience 3.1 percent. Figure 4-15 illustrates the employment effects of the IL 83/US 45 with US 12 Alternative by NIPC analysis zones.

4.1.6 Tax Revenues

A short-term tax revenue loss in the region will result from converting taxable land into a nontaxable transportation use. To evaluate tax losses, information was obtained from the Lake County Tax Assessor's office. Values of the taxable properties to be acquired for right-of-way were estimated and separated into commercial and residential when possible due to different tax rates. This assessment included the value of land and improvements to the land (i.e., structures on the property).

Table 4-11 summarizes the results of this analysis.

The tax loss analysis shows that annual assessed value losses are estimated to be 0.20 percent for the No-Action Alternative (Baseline), 0.30 percent for the IL 53 Freeway/Tollway Alternative, and 0.47 percent for the IL 83/US 45 with US 12 Alternative. The potential loss for any alternative would be less than 0.50 percent, so it is likely that no taxing district would suffer a loss greater than 10 percent of its current tax base.

New development resulting from improved accessibility provided by the project may be added to the tax rolls. This could result in an increase in assessed valuation because of the new development and an overall increase in total taxes collected. In addition, an increase in tax revenues may result from an increase in property values due to the improved accessibility provided by either build alternative.

4.1.7 Environmental Justice

4.1.7.1 Racial, Ethnic, and Low-Income Groups

This section describes the potential for disproportionate impacts to low-income and minority populations that could occur with the project alternatives. The assessment included a technical analyses to determine potential effects and the use of public involvement activities that included all residents and population groups in the study process. It did not exclude any person based on income, race, color, religion, national origin, sex, age, or handicap. For each alternative, the influence area is defined by the census tracts bordering the proposed improvements. A disproportionate impact to these populations exists when they bear more than their "fair share." Compared to the general population, it was determined that there would be no disproportionate impact to low-income populations (in accordance with Health and Human Services Poverty Guidelines) or minority populations within the influence area of the alternatives.

TABLE 4-11
Estimated Tax Loss Summary, by Alternative

Alternative	Assessed Value in 1998 (Lake County)	Portion Converted to Nontaxable Use	Percent of Total Assessed Value Converted
No-Action	$16.1 billion	$32.2 million	0.20
IL 53 Freeway/Tollway	$16.1 billion	$48.2 million	0.30
IL 83/US 45 with US 12	$16.1 billion	$76.1 million	0.47

No-Action Alternative (Baseline).
The detailed analysis of the project influence area for the No-Action Alternative (Baseline) showed no disproportionate impact to low-income and minority populations. The analysis showed that the median household income in the influence area was $57,000 or 25 percent greater than the countywide median household income ($46,047). Additionally, the examination of minority populations showed that only 8 percent of the population in the influence area is minority, well below the countywide average of 12.6 percent.

Further analysis show isolated areas of minority populations in Gurnee/Waukegan, Mundelein/Vernon Hills and Buffalo Grove. The census information shows that at the block group level, the potential exists for direct impact to minority populations in the Gurnee/Waukegan area near Martin Luther King Road and IL 131, in the Mundelein/ Vernon Hills area near Butterfield Road and IL 60, and near Lake-Cook Road and US 45. Any displacement to residential or businesses would be small.

IL 53 Freeway/Tollway Alternative.
The detailed analysis of the project influence area for the IL 53 Freeway/Tollway Alternative showed no disproportionate impact to low-income and minority populations. The analysis showed that the median household income in the influence area was $49,279 or 7 percent greater than the countywide median household income ($46,047). Additionally, the examination of minority populations showed that only 6 percent of the population in the influence area is minority, well below the county average of 12.6 percent.

Further analysis of this alternative showed isolated areas of minority populations in Gurnee/Waukegan. Taking a closer at the census information, at the block group level, there would be the potential for direct impact to minority populations in the Gurnee/ Waukegan area near IL 120 and O'Plaine Road. Any displacement to residential or businesses would be small.

IL 83/US 45 with US 12 Alternative.
The detailed analysis of the project influence area for the IL 83/US 45 with US 12 Alternative showed no disproportionate impact to low-income and minority populations. The analysis showed that the median household income in the influence area was $58,374 or 27 percent greater than the countywide median household income ($46,047). Additionally, the examination of minority populations showed that only 6 percent of the population in the influence area is minority, well below the countywide average of 12.6 percent.

Further analysis show isolated areas of minority populations in Mundelein/Vernon Hills. The census information at the block group level shows the potential exists for direct impact to minority populations in the Mundelein/Vernon Hills area near IL 60 and IL 83, and IL 60 and US 45. Any displacement to residential or businesses would be small.

4.1.7.2 Summary of Environmental Justice

An assessment of environmental justice also includes considerations of other factors such as environmental health effects of air and noise pollution upon low-income and minority populations. The air quality analysis (Section 4.4, *Air Quality*) showed that none of the project alternatives would cause exceedances of national ambient air quality standard for carbon monoxide. The noise analysis (Section 4.5, *Noise*) showed that, for all alternatives near the minority populations discussed above, the potential exists for noise volumes either approaching or exceeding the Noise Abatement Criteria (NAC) for residential areas. Noise abatement measures at those locations and others will be considered in the analysis of the preferred alternative.

In summary, no disproportionately high or adverse impacts on minority and low-income populations would result from any alternative.

4.1.8 Public Services and Facilities

4.1.8.1 No-Action Alternative (Baseline)

The No-Action Alternative (Baseline) would not affect municipal or public facilities in Lake County, nor would it provide distinct opportunities for facility enhancements.

4.1.8.2 IL 53 Freeway/Tollway Alternative

The IL 53 Freeway/Tollway Alternative would have minimal affect upon public service facilities. The Church of the Nazarene would lose about 2 percent of its parking with this alternative. The church is located in Mundelein on the east side of the proposed IL 53 alignment and on the south side of IL 176 (Maple Street). Sufficient parking would remain for typical church activities. Other facilities, such as wastewater treatment plants, schools, municipal buildings, and hospitals, would not be affected.

The alternatives would provide numerous opportunities for new bicycle travel. Inclusion of a new bicycle/pedestrian path along the proposed improvements would provide direct and indirect connections to existing paths including the Robert McClory Path and the Des Plaines River Trail. Potential connections between a new bicycle/pedestrian path would be considered for rail stations and employment centers. Candidate facilities near the project alternative are Grayslake and Prairie Crossing/Libertyville rail stations, and business centers such as Kemper Insurance, Motorola, and Baxter Healthcare. The promotion of nonmotorized travel for work trips would improve traffic operations to a minor degree.

4.1.8.3 IL 83/US 45 with US 12 Alternative

This alternative would affect nine public facilities. As many as five buildings may be displaced by this alternative, and four additional facilities would lose some parking area as a result of the proposed improvements.

The Lord of Glory Church is located west of Alleghany Road on the south side of IL 120 and serves the community of Grayslake. Widening of IL 120 would require removal of the facility. The church would need to be relocated within the area.

A building associated with the Grainger Woods Forest Preserve near Mettawa would likely be displaced. The building is located on the east side of St. Mary's Road south of IL 60. The building is associated with a public stable operation. Loss of the building would require consultation and coordination with the Lake County Forest Preserve under Section 4(f) requirements (Section 4.8, *Section 4(f) Considerations*).

Two IDOT buildings would be displaced. The maintenance yard on the south side of US 12 east of Ela Road in Lake Zurich would lose frontage as well as at least one building (shed). The IDOT maintenance facility on the east side of US 45 near the IL 60 intersection in Mundelein would be displaced as a result of intersection improvements.

The David Adler Cultural Center at 1700 N. Milwaukee in Libertyville, south of IL 137 on the east side of IL 21, would be displaced. The facility provides music lessons and art classes to the community.

Four public facilities would lose some parking as a result of the improvements for this alternative. The Congregation Beth Judea School, located north of Hilltop Road on the east side of IL 83 in Long Grove, would lose 10 percent of its parking area. The Lake County Juvenile Justice Center on the east side of IL 21 north of Woodbine Court in Vernon Hills would lose about 5 percent of its available parking to the right-of-way needed for the proposed improvements. The Adler Park School would lose 4 percent of its parking, and the Church of the Nazarene would lose a few parking spaces.

This alternative offers the potential for enhancements to nonmotorized travel. The planned cross section for the arterial improvements include sufficient right-of-way for bicycle and pedestrian paths. The addition

of paths along the planned improvements would provide direct and indirect connection with four major trail systems: Des Plaines River Trail, Robert McClory Path, the Skokie Valley Trail, and the Green Bay Trail. Improved connections to other activity nodes also would be possible, including rail stations and employment centers. Direct connections to rail stations on the North Central Line would include Buffalo Grove, Prairie View, Vernon Hills, and Libertyville. These nonmotorized improvements would relieve traffic operation to a minor degree.

4.1.8.4 Summary of Socioeconomic Impacts

Population forecasts show that Lake County is growing substantially without major transportation improvements. Under the No-Action Alternative (Baseline), 280,000 people would be estimated to be added to Lake County by 2020, mostly in the central and western parts of the county. The IL 53 Freeway/Tollway Alternative would bring an additional 27,500 residents to the county over the No-Action Alternative (Baseline).[4] These additional residents are anticipated to locate mostly in the central part of the county (Figures 4-2 and 4-4). The IL 83/US 45 with US 12 Alternative would bring an additional 18,000 residents over the No-Action Alternative (Baseline). This growth would occur in the same general areas as with IL 53 Freeway/Tollway Alternative (Figures 4-2 and 4-5), predominantly in the central part of the county.

The migration of jobs to areas like Lake County is consistent with manufacturing and business interest in locations where an abundance of land is available, obtainable in large parcels, and relatively inexpensive. Similar to the forecast population growth, regional planning agencies estimate Lake County's employment to continue to increase, mostly in the southern and central parts of the county (Figure 4-13). By 2020, under the No-Action Alternative (Baseline), Lake County is forecast to have 390,000 jobs. This means that, with no major transportation improvements, Lake County's employment will increase by 70 percent (161,000 jobs) over 1990 levels. With both the IL 83/US 45 with US 12 and IL 53 Freeway/Tollway Alternatives, Lake County is anticipated to have 394,000 jobs—a 72 percent increase over 1990 (between 4,200 and 4,400 additional jobs over the No-Action Alternative (Baseline)).

The analysis of minority or low-income populations for the project alternatives show that no environmental justice issue exists, and thus no further analysis or mitigation is required. The public involvement activities for this process included all residents and population groups in the study area, and did not exclude any persons based on income, race, color, religion, national origin, sex, age, or handicap.

All alternatives would require relocations, with IL 83/US 45 with US 12 having the greatest with 195 business and 187 residences (Table 4-12, on the following page). Lake County has a full complement of housing and business stock. In 1990, the overall vacancy rate for residential housing in Lake County was 51 percent (Lake County Department of Planning, Zoning & Environmental Quality 1994). The IL 83/US 45 with US 12 Alternative would displace nine public services and facilities, and the No-Action Alternative (Baseline) and IL 53 Freeway/Tollway Alternatives would affect none. Conversion of land to public roadway would remove taxable property from the tax roles. Table 4-12 lists the estimated assessed value lost for each alternative.

4.2 Agricultural Impacts

This section highlights the major agricultural effects that could occur from the implementation of the project alternatives including farmland losses, impacts to special status farmland or farms, farm production losses, and impacts to farm operations.

Coordination with the Illinois Department of Agriculture was conducted to determine

[4]The Elgin, Joliet and Eastern Railroad improved is anticipated to increase population by an additional 2,000 residents for both the IL 53 Freeway/Tollway Alternative and the IL 83/US 45 with US 12 Alternative.

potential effects to prime farmlands, as well as special farmland types such as farmland of local importance, farmland protected under the Illinois Farmland Preservation Act, and Centennial Farms. Coordination with the Natural Resource Conservation Service (NRCS) is required only for agricultural impacts that occur outside the "official" planning area for incorporated municipalities (2.4 km or 1.5 mi), and for agricultural impacts that are expected to be greater than 1.2 ha per 1.6 km (3.0 ac per 1 mi).

Factors that may adversely affect the efficiency of farming operations include the following:

- **Severed Farm Operation**—Occurs when a new highway/roadway separates one or more parcels from others within a unit, often resulting in adverse travel for the farm operators.
- **Severed Parcel**—Unit of land severed diagonally or laterally by a new highway.
- **Farmer Adverse Travel**—Length of additional travel that a farm operator or owner must undertake to get to fields or roads. Often caused by severance of a farm unit.
- **Landlocked Parcel**—Parcel created by the taking of right-of-way for road construction such that it is not accessible by road or easement after construction.
- **Farm Displacement**—Farmhouses and other buildings may need to be displaced to accommodate the new highway/roadway.

Farmland impacts were determined using the land use data from the LCTIP GIS database. The land use data were provided by NIPC (1990) and updated using 1997 aerial photography. Further updates were considered, using the State Cropland Layers (USDA 1999–2000). A comparison of the 1997 and 2000 data showed only minor differences; therefore, the 1997 update was used for this analysis. The assessment of prime farmland used 1993 soil data compiled by the Natural Resources Conservation Service (USDA). An assessment of effects on eroded soils was also conducted using the 1993 soil data. The results of this assessment are contained in Section 4.3.1, *Geology, Soils,*

TABLE 4-12
Socioeconomic Summary

	No-Action	IL 53 Freeway/Tollway	IL 83/US 45 with US 12
Population 2020 Forecast	796,942	29,339	19,968
(Contribution of Roadway Improvements Only to Build Alternative Forecasts)*	—	27,500	18,000
Households 2020 Forecast	290,570	10,962	7,640
Employment 2020 Forecast	389,545	4,444	4,200
Residential Relocations (Additional Ancillary Outbuildings associated with Residential Relocations)	67	113 (45)	187 (25)
Business Relocations	23	9	195
Number of Employees	NA	178	3,428
Parking Impacts (# of displaced parking spaces)	NA	109 (0)	2,514 (258)
Public Facility Relocations	0	0	9
Percent of Total Assessed Value Converted to Non-Taxable Use	0.20	0.30	0.47

*The remainder—about 2,000 people—is attributed to Elgin, Joliet and Eastern commuter rail improvement.

and Mineral Resources. The prime farmland and eroded soil impacts discussed above were assessed for the build alternatives only.

The potential for the project alternatives to influence growth and development is often referred to as a secondary impact stemming from infrastructure improvements. As new development expands to vacant lands within the county, farmlands most often are impacted. Although better transportation is not the predominant reason for advancing development in Lake County, it does have a role in some development decisions. An analysis of secondary impacts to farmlands is included in Section 4.11, *Secondary and Cumulative Impacts.*

4.2.1 No-Action Alternative (Baseline)

4.2.1.1 Direct Farmland Impacts

About 32 ha (80 ac) of agricultural land in Lake County would be directly affected by the No-Action Alternative (Baseline). Table 4-13 provides a breakdown of agricultural impacts by roadway improvement for the No-Action Alternative (Baseline). Roughly 85 percent of the affected farmland is "prime"; the balance is classified as "important." More than half of the affected farm parcels would involve small impacts of less than 0.4 ha (1 ac). Over 90 percent of the farmland impacts are associated with the proposed improvements to IL 21, Peterson Road, Rollins Road, Bradley Road, Midlothian Road, and Washington Street. Compared to the total available farmland in the county, the No-Action Alternative (Baseline) would affect less than 0.1 percent of those lands. The affected farmland for this alternative would be entirely within a municipal planning boundary and average less than 0.28 ha per project km (1.1 ac per mi). Therefore, NRCS coordination and submittal of form AD-1006 would not be required.

A review of the Illinois Department of Agriculture records show that there are nine Centennial Farms within Lake County. The No-Action Alternative (Baseline) would impact land from two Centennial Farms: the Lodesky Farm located on Washington Street and the Casey Farm located on IL 21. The Lodesky Farm has been in the family for over 150 years, and the present size of the farm is about 40 ha (100 ac). The No-Action improvements along Washington Street would require approximately 0.5 ha (1.3 ac) from the Lodesky property. The Casey Farm located in Libertyville is currently about 12 ha (30 ac) in size. The improvement to IL 21 in this location would require approximately 0.8 ha (2 ac) from the farm.

4.2.1.2 Farm Production Losses

The displaced farmland for the No-Action Alternative (Baseline) would result in an annual crop production loss of approximately $21,000. Table 4-14 (on the following page) provides a

TABLE 4-13

Agricultural Areas Directly Affected by No-Action Alternative (Baseline)

Route	Approximate Agricultural Land Directly Affected		Route	Approximate Agricultural Land Directly Affected	
Buffalo Grove Road	0.16 ha	0.4 ac	Lake-Cook Road	0.36 ha	0.9 ac
Busch Parkway	0.4 ha	1.0 ac	Bradley Road	4.3 ha	10.6 ac
Butterfield Road	0.2 ha	0.5 ac	Midlothian Road	2.75 ha	6.8 ac
Hunt Club Road	0.24 ha	0.6 ac	Casmir Pulaski Drive	0.24 ha	0.6 ac
I-94	0.24 ha	0.6 ac	Peterson Road	3.7 ha	9.2 ac
IL 21	7.4 ha	18.2 ac	Quentin Road	0.12 ha	0.3 ac
IL 22	2.3 ha	5.8 ac	Rollins Road	4.1 ha	10.0 ac
IL 60	0.04 ha	0.1 ac	US 45	2.4 ha	6.0 ac
Washington Street	3.4 ha	8.5 ac	**Total**	**32.4 ha**	**80.1 ac**

breakdown of the amount of farmland affected by this alternative and the resulting farm production loss. The primary crops are corn (70 percent), soybeans (22 percent), wheat (6 percent), and other specialty farms (2 percent) such as landscape nurseries and apple orchards.

4.2.1.3 Farm Operations

The No-Action Alternative (Baseline) would have minimal effect on farm operations. Generally, the roadway improvements follow existing rights-of-way; therefore, farm severance and disrupted access to fields are minimized by the use of existing rights-of-way. The actual impacts to farms, parcels, building displacement, and uneconomical remnants were not calculated for the No-Action Alternative (Baseline). The use of medians with multi-lane improvements would cause some adverse travel of about 1.6 km (1 mi) or less.

4.2.2 IL 53 Freeway/Tollway Alternative

4.2.2.1 Direct Farmland Impacts

Approximately 316 ha (780 ac) of agricultural land in Lake County would be directly affected by the IL 53 Freeway/Tollway Alternative. Table 4-15 summarizes the farmland impacts for this alternative. The impact to farmlands is associated directly with improvements located primarily on new alignment. The data shows that the impacts would be distributed evenly across the two major roadway improvements. Similar to the other alternatives, the IL 53 Freeway/Tollway Alternative would affect mostly prime farmlands (about 77 percent), the balance being classified as important. Overall, this alternative would directly affect 1.3 percent of the county's available farmland. Based on an Illinois Department of Agriculture records search, the IL 53 Freeway/Tollway Alternative would not affect any special status farmlands (i.e., Centennial Farms) (TY Lin Bascor 2000).

This alternative affects approximately 7 ha per project kilometer (29 ac per mile). Whereas all of the affected farmlands for this alternative are located within a municipal planning area, the NRCS would have no requirements for coordination. Therefore, NRCS coordination and submission of form AD-1006 would not be required.

4.2.2.2 Farm Production Losses

Approximately 315 ha per kilometer (780 ac)

TABLE 4-14
Crops and Market Value Affected by No-Action Alternative (Baseline)

Agricultural Lands in Production[a]	15,800 ha (39,100 ac)
Affected Agricultural Lands	32.4 ha (80.1 ac)
Total Market Value (2000)[a, b]	$10,293,000
Market Value of Affected Lands[c]	$21,000

[a] Source: Illinois Department of Agriculture 2001
[b] Includes all crops and livestock, as well as specialty crops such as landscape nurseries, apple orchards, etc.
[c] Per 0.4 ha (1 acre) loss is $260.00

TABLE 4-15
Agricultural Areas Directly Affected by IL 53 Freeway/Tollway Alternative

Route	Approximate Agricultural Land Directly Affected
IL 120	147.5 ha (364.6 ac)
IL 53	167.9 ha (415.0 ac)
Total	**315.4 ha (779.6 ac)**

of productive farmland would be lost with the IL 53 Freeway/Tollway Alternative. This represents an annual production loss of approximately $205,000. Table 4-16 provides a breakdown of the amount of land affected by the improvements and resulting farm production loss.

4.2.2.3 Farm Operations

The IL 53 Freeway/Tollway Alternative would sever about 36 farm parcels, potentially affecting farm operations with landlocked parcels, adverse travel, and angular shapes. This alternative would displace 12 farm residences and 31 farm outbuildings. Over 80 percent of the displaced are located along the east-west improvement paralleling IL 120.

4.2.3 IL 83/US 45 with US 12 Alternative

4.2.3.1 Direct Farmland Impacts

Approximately 91 ha (226 ac) of farmland in Lake County would be directly affected by the IL 83/US 45 with US 12 Alternative. Table 4-17 provides a detailed breakdown of the farmland impacts for this alternative. Similar to the other alternatives, the IL 83/US 45 with US 12 Alternative would impact farmlands that are mostly classified as prime (about 82 percent), and remaining affected farmlands are classified as important. The data shows (Table 4-17) that two improvements account for over 80 percent of the farmland impact from this alternative. Overall, this alternative would directly impact

TABLE 4-16
Crops and Market Value Affected by IL 53 Freeway/Tollway Alternative

Agricultural Lands in Production[a]	15,800 ha (39,100 ac)
Affected Agricultural Lands	315.4 ha (779.6 ac)
Total Market Value (2000)[a, b]	$10,293,000
Market Value of Affected Lands[c]	$205,000

[a] Source: Illinois Department of Agriculture 2001
[b] Includes all crops and livestock, as well as specialty crops such as landscape nurseries, apple orchards, etc.
[c] Per 0.4 ha (1 acre) loss is $260.00

TABLE 4-17
Agricultural Areas Directly Affected by IL 83/US 45 with US 12 Alternative

Route	Approximate Agricultural Land Directly Affected
I-94	2.3 ha (5.6 ac)
IL 120	21.9 ha (54.0 ac)
IL 21	10.8 ha (26.8 ac)
IL 60	1.7 ha (4.2 ac)
IL 83/US 45	54.1 ha (133.7 ac)
US 12	0.65 ha (1.6 ac)
Total	**91.4 ha (225.9 ac)**

about 0.5 percent of the county's available farmlands.

This alternative would have an average farmland impact of 0.9 ha per project kilometer (3.6 ac per mile). The affected farmlands would all be within a municipal planning area; therefore, NRCS coordination and form AD-1006 would not be required.

Illinois Department of Agriculture records show that the IL 83/US 45 with US 12 Alternative would potentially impact land from one Centennial Farm (IDOA 2000). The improvement on IL 21 would require about 0.4 ha (1 ac) of right-of-way from the Casey Farm in Libertyville. The farm has been in the Casey family for over 130 years and the current size is about 12 ha (30 ac).

4.2.3.2 Farm Production Losses

Approximately 91 ha (226 ac) of productive farmland would be lost with the IL 83/US 45 with US 12 Alternative. This represents an annual production loss of about $59,300. Table 4-18 summarizes the amount of land affected by the improvements and resulting farm production loss.

4.2.3.3 Farm Operations

Since most of the improvements are along existing right-of-way, operational impacts are expected to be moderate. About 20 parcels would be severed diagonally or laterally, potentially affecting farm operations with landlocked parcels, adverse travel, and angular shapes. This alternative would displace three residences and seven outbuildings. All displacements would occur along IL 21.

4.2.4 Summary of Agricultural Impacts

Table 4-19 summarizes the breakdown of the agricultural impacts by alternative.

TABLE 4-18
Crops and Market Value Affected by IL 83/US 45 with US 12 Alternative

Agricultural Lands in Production[a]	15,800 ha (39,100 ac)
Affected Agricultural Lands	91.4 ha (225.9 ac)
Total Market Value (2000)[a, b]	$10,293,000
Market Value of Affected Farmland[c]	$59,300

[a] Source: Illinois Department of Agriculture 2001
[b] Includes all crops and livestock, as well as specialty crops such as landscape nurseries, apple orchards, etc.
[c] Per 0.4 ha (1 acre) loss is $260.00

TABLE 4-19
Summary of Agricultural Impacts

Type of Impact	No-Action Alternative (Baseline)	IL 53 Freeway/Tollway Alternative	IL 83/US 45 with US 12 Alternative
Ha (ac) of Impact	32 ha (80 ac)	315 ha (780 ac)	91 ha (226 ac)
Annual Crop Losses	$21,000	$205,000	$59,300
Annual Acreage Losses	$260	$260	$260
Parcels Affected or Severed	NA	36	20
Centennial Farms	9	0	1
% Impact of Prime/Important	85 / 15	77 / 23	82 / 18
Farm Buildings Displaced	NA	43	10

4.3 Natural Resources

4.3.1 Geology, Soils, and Mineral Resources

The project alternatives are not expected to affect bedrock. Some impact to surface geology and topography would be expected during construction, including excavating, grading, and filling over the near-surface deposits. These effects would include changes to surface soils in the construction zone that would increase soil compaction and effectively decrease hydraulic conductivity. Construction would also decrease the erosion resistance of soils with the removal of vegetation. Erosion resistance will be mitigated during construction and then restored through appropriate revegetation and grading.

The erosion potential of soils for the build alternatives were evaluated using the NRCS 1993 soils data. Soil associations along the improvements for each alternative were identified and the erosion potential determined from tables contained within the soil survey.

Two soil associations are found in the IL 53 Freeway/Tollway Alternative—the Elliot-Markham and Morley-Markham-Houghton. The Markham, Morley, Nappannee, Montmorenci, Zurich, and Saylesville soils in these associations are moderately to strongly sloping. The soils consist primarily of silt loams. These eroded soils exist along 18 percent or 8 km (5 mi) of the 43.5 km (27 mi) of improvements. Additional soils in these series, although not noted as eroded, pose an erosion hazard. Specific locations of soils with higher erosion hazards would be identified to mitigate erosion during and after construction. The other soils in the associations are gently sloping to level and pose limited erosion hazard.

The same two soil associations are also found in the IL 83/US 45 with US 12 Alternative. Additional soil associations found in this alternative including the Montmorenci, Corwin-Odell, Zurich-Grays-Wauconda, and Nappanee-Montgomery. The Miami, Montmorenci, Wauconda, Saylesville, and Zurich soils are all silt loams that are moderately to steeply sloping. The soils all have high erosion potential. The eroded soils exist along 17 percent or 15.3 km (9.5 mi) of 101.4 (63 mi) of improvements. Additional soils in these series, although not noted as eroded, pose an erosion hazard. Specific locations of soils with higher erosion hazards would be identified to mitigate erosion during and after construction. The other soils in the associations are gently sloping to level and pose limited erosion hazard.

No operating mineral/material resource businesses would be affected by the project alternatives. A nonoperational sand and gravel operation lies near the intersection of IL 21 and IL 120, and project alternatives could affect this resource. The site's proximity to planned roadway improvements could cause the site to be reactivated and also provide a low-cost source of needed sand and gravel resources. Overall the project could increase short-term demand and sales for these products within Lake County during the construction phase. Consequently, this resource could be depleted. Upon completion of construction, demand and sales would be expected to return to previous levels.

4.3.2 Water Quality and Water Resources

4.3.2.1 Groundwater Resource Impacts

This analysis focuses upon potential effects of the project alternatives to municipal and private water supplies. According to the USEPA web site (as of February 1, 2001), there are no sole source aquifers as defined by section 1424(E) of the Safe Drinking Water Act in Illinois. No measurable change to the available groundwater supply is expected for any of the project alternatives; the additional impervious area associated with the project alternatives would represent a small reduction in recharge area that will be mitigated by stormwater retention/detention basins.

Although roadways are not considered a source for groundwater contamination, those items that are sources are required to be at

least 61 meters (200 ft) away from a well head, the distance used as a surrogate for impact evaluation. The well location from all of the listed databases is only accurate to a quarter-quarter section. Therefore the well can be located anywhere within a 40 acre tract. Wells within 61 m (200 ft) of the proposed project alternatives were identified and are shown in Table 4-20. The well location information was assembled using the ISGS database, the LCTIP GIS database, the IEPA database, and reports from the Illinois State Water Survey (ISWS) to pinpoint the location of residential well systems. The IL 83/US 45 with US 12 Alternative has more homes associated with private wells within 61 m (200 ft) of the proposed improvements than the other alternatives. There are no municipal wells within 122 m (400 ft) used for municipal wells for the build alternatives, and only two municipal wells for the No-Action Alternative (Baseline). The wells are either used regularly as a water supply or standby supply for communities that purchase surface water for their customers.

Municipal and private wells near the proposed project alternatives were identified as having a potential risk for contamination from roadway runoff. The potential for contaminating groundwater supply wells is dependent upon well construction, proximity to potential sources, and geological conditions. The Illinois Groundwater Protection Act provides guidelines and regulations pertaining to protective setbacks from groundwater wells. Consistent with these guidelines and regulations, communities in the study area have established either 61 or 122 m (200 or 400 ft) setback zones for potential contamination sources that could affect the quality of groundwater wells. Geologic conditions also represent an important factor that can either prohibit or permit the transfer of contaminants. Wells founded in rock formations usually are more restrictive to the transfer of surface contaminants than wells founded in sand and gravel formations, such as in west central Lake County.

Groundwater quality for municipal wells is not likely to be affected measurably by any of the project alternatives. One municipal well within 122 m (400 ft) of the No-Action Alternative (Baseline) is finished in the drift material. The IEPA database indicates this well has few limitations, or in other words, has low susceptibility to surface contamination based upon the composition of the surficial geology. The other well is finished in dolomite or a limestone formation that minimizes the transfer of surface contaminants. None of the project alternatives are located within wellhead protection areas identified by the IEPA (1998). Private wells are associated with residential subdivisions or individual properties and typically are finished in glacial drift (sand and gravel) at depths of 30.5 m (100 ft) or less. Shallow wells within 61 m (200 ft), of the roadway improvements that are improperly cased or hydraulically connected to the highway drainage system could experience increased levels of roadway runoff contaminants. Roadway improvements near shallow wells would use best management practices (BMPs) to avoid well interference.

All the project alternatives have several groundwater wells near them. This assessment provides a general measure of the potential for groundwater contamination from roadway runoff. Presumably, the risk for well contamination is greater for those alternatives with the largest number of wells near the

TABLE 4-20
Summary of Potential Water Well Impacts

Alternative	Private Wells	Municipal Systems Using Wells
No-Action	220	2
IL 53 Freeway/Tollway	247	0
IL 83/US 45 with US 12	783	0

proposed improvements (i.e., the IL 83/US 45 with US 12 Alternative). Further investigations are required during future phases of work for the preferred alternative to define more accurately the potential risk of well contamination.

Other areas of potential concern relate to groundwater discharge points associated with sensitive wetland areas, such as fens. Changes in groundwater elevation or quality could affect these sensitive resources. These types of assessments would be made during future phases of work for the preferred alternative and would require further definition of the roadway design and the use of groundwater models to properly assess the effects to such resources.

4.3.2.2 Surface Water Impacts

Long-term surface water impacts could result from the operation of the project alternatives. Pollutants, such as solids, heavy metals (lead, zinc, and copper), and oil and grease, accumulate on roadway surfaces and adjoining rights-of-way as a result of motor vehicle operations on the roadway. Additionally, deicing chemicals and nutrients from fertilizers commonly are found in roadway runoff. The concentrations of these pollutants in roadway runoff are highly variable and are affected by numerous factors, such as traffic characteristics (volume and speed), climate, maintenance practices, and adjacent land uses.

Roadway runoff may affect the quality of receiving waters with a temporary increase in pollutant loading during storms or with a chronic accumulation of heavy metals. The degree of pollutant loading from roadway runoff is linked directly to the amount of roadway traffic. Research has shown that the water quality from roadway runoff is not problematic for roadways with an Average Daily Traffic (ADT) volume of 30,000 vehicles per day or less (Young 1996). Under these conditions, potential impacts are generally short-term, localized acute loadings with a temporary degradation of water quality with few, if any, chronic effects.

Deicing salt is applied seasonally to control snow and ice. Deicing salt provides public mobility and safety by rapidly and reliably improving hazardous road conditions in winter. Salt moves through the environment as runoff, splash, and spray. Studies indicate that 60 to 80 percent of the salt runs into surface water, 15 to 35 percent occurs as splash, and up to 3 percent occurs as spray (Frost et al. 1981; Diment et al. 1973; Lipka and Aulenbach 1976; and Sucoff 1975).

Changes in chloride and heavy metals concentrations as a result of roadway operations were compared to the General Use water quality standards. The average and maximum concentrations in each stream were estimated utilizing methods developed by the U.S. Geological Survey (Driver and Tasker 1990 and Frost et al. 1981) and the Federal Highway Administration (FHWA; Driscoll et al. 1990a, 1990b, 1990c).

No-Action Alternative (Baseline). There are 11 subwatersheds associated with the No-Action Alternative (Baseline): nine in the Des Plaines River Watershed and two in the Fox River Watershed. Tables 2-19 and Table 2-20 present the physical and biological characteristics of these streams.

Pollutant concentrations and habitat modifications have affected the water quality of the streams in these watersheds. According to the IEPA, water quality is good in Mill Creek, Bull Creek, and Flint Creek, whereas in the remaining streams in the study area it is fair to poor, or unrated. The Des Plaines River is a Section 303(d) water quality impaired stream.

Future stream concentrations of copper, lead and zinc for 11 subwatersheds would satisfy applicable General Use water quality standards. The analysis shows that the maximum chloride concentrations expected with the No-Action Alternative (Baseline) would be compliant with the General Use standards.

IL 53 Freeway/Tollway Alternative. There are seven subwatersheds in IL 53 Freeway/Tollway Alternative: five in the Des Plaines River Watershed and two in the Fox River Watershed. Many of these streams are

the same as for the No-Action Alternative (Baseline). Tables 2-19 and 2-20 summarize the physical and biological characteristics of these streams. Water quality in Mill Creek and Bull Creek is good, but fair to poor (or unrated) in the remaining streams. Pollutant concentrations and habitat modifications have prevented the remaining streams, including the Des Plaines River—a Section 303(d) water quality impaired stream—from providing full aquatic support.

Analysis of the pollutant loading for seven subwatersheds affected by the IL 53 Freeway/Tollway Alternative showed only small incremental changes in heavy metal concentrations. All stream concentrations for zinc, copper, and lead are less than the applicable General Use standards. The analysis showed that the average and maximum chloride concentrations would remain below the General Use standards for all subwatersheds affected by this alternative. Chloride concentrations in the Bull Creek and Mill Creek watersheds were estimated to be the highest. Even the maximum values, however, would be compliant with the General Use standard.

IL 83/US 45 with US 12 Alternative. There are 11 subwatersheds associated with this alternative: 7 in the Des Plaines River Watershed and 4 in the Fox River Watershed. The only highly valued aquatic resource is associated with Squaw Creek. Water quality for Mill, Bull, and Flint creeks is rated good by IEPA, but other streams in the study area are fair to poor. The Des Plaines River is the only water quality impaired Section 303(d) stream in the study area.

Analysis of the pollutant loading for the 11 subwatersheds affected by the IL 83/US 45 with US 12 Alternative showed only small incremental changes in heavy metal concentrations. All stream concentrations for zinc, copper, and lead are below the applicable General Use and water quality standards. Chloride concentrations are not expected to increase to levels exceeding the General Use standards in any of the subwatersheds, except for Aptakisic Creek. The average chloride concentration is not expected to exceed the water quality standard; however, the maximum predicted chloride level may exceed the 500 mg/L standard for chloride. Exceedances would occur in a small area of the watershed, and mitigation measures or changes in drainage patterns could reduce the impact.

4.3.2.3 Summary of Water Quality Impacts

Potential changes in groundwater or surface water quality as a result of roadway operation were evaluated. The potential impact on residences that rely on wells would be greatest with the IL 83/US 45 with US 12 Alternative. Two municipal wells are closer to the No-Action Alternative (Baseline), but the geology associated with those wells should minimize any potential impact.

Stream concentrations of heavy metals will increase, but they will remain compliant with applicable water quality standards for all three scenarios. BMPs incorporated into the project would further reduce these concentrations.

The chloride concentrations in the tributaries for the various project alternatives are expected to increase, but such increases would not violate the General Uses standards in most watershed areas. Impacts from chlorides would not be a concern for either the IL 53 Freeway/Tollway or No-Action Alternative (Baseline). With the IL 83/US 45 with US 12 Alternative, a small part of Aptakisic Creek would experience an exceedance of the chloride standard. Studies of salt effects on aquatic biota, including acute and chronic toxicity, indicate that salt does not have significant deleterious impacts on aquatic biota in large or flowing bodies of water where dilution occurs quickly (Jones and Jeffrey 1992). Peak concentrations in small streams can be reduced by using detention basins.

4.3.3 Wetlands

This wetland impacts discussion addresses direct impacts for the project alternatives. Available wetland mapping and the latest aerial photography were combined with field

reconnaissance to confirm the presence of wetland resources in the study area. Wetland resources in Lake County were obtained from the LCWI and incorporated into an overall GIS database. The verification procedure was limited to the areas adjacent to the proposed and existing right-of-way for the two build alternatives. Field observations were used to note adjacent land use, general wetland type, and overall quality based upon dominant vegetation.[5] The potential wetland impacts for the alternatives describe the extent of the wetland area impacted, the effect on wetland function, and the status of the remnant wetland following implementation (i.e., for bisected wetlands).

The first order of assessment utilized the GIS database, which incorporated data from the LCWI, including ADID wetlands. All three alternatives were reviewed to determine potential impacts to both ADID designated and non-ADID wetlands for each corridor. These data are reported in the first part of this section.

The information supplied by the LCWI and ADID lacked the information necessary to determine wetland quality. The second order of assessment provided a qualitative assessment of wetlands, both ADID and non-ADID based on information gathered during the field verifications. As no field verifications were conducted for the No-Action Alternative, the qualitative assessment is limited to the two build alternatives. However, environmental documents for programmed improvements which have completed phase one of the environmental document for the No-Action Alternative (Baseline) were reviewed for the wetland impacts.

The qualitative functional assessment assigned quality rankings to each of the wetlands identified in the field. As a result, an assessment of qualitative impacts for the two build alternatives could be compiled. This qualitative impact assessment is presented in the second part of this section.

Formal delineations would be conducted during future phases of work for the preferred alternative to determine exact size, functions, vegetation communities, and qualitative assessments of wetlands within the proposed right-of-way.

4.3.3.1 ADID/Non-ADID Wetland Impacts

No-Action Alternative (Baseline)

The No-Action Alternative (Baseline) would potentially impact approximately 31.6 ha (78.1 ac) of both ADID and non-ADID wetlands (CH2M HILL 1999; GIS database). The estimated loss of wetland resources is based upon the proposed right-of-way requirements for all individual projects comprising the No-Action Alternative (Baseline).

ADID Wetlands. The No-Action Alternative (Baseline) would potentially impact approximately 5.3 ha (12.9 ac) of ADID wetlands.[6] The proposed improvements to Lake Cook Road, Pulaski Road and IL 22 would have the largest impact to ADID wetlands. Combined, these three improvements account for approximately 75 percent of the ADID wetland impacts for the No-Action Alternative (Baseline). See Figure 4-16. The ADID impacts resulting from this alternative total 0.09 percent of the total ADID wetland acreage in Lake County (203 total ADID wetlands totaling 5,585 ha (13,800 ac) in Lake County). Table 4-21 (on the following page) summarizes the ADID impacts for each roadway improvement under the No-Action Alternative (Baseline).

Non-ADID Wetlands. The No-Action Alternative (Baseline) would potentially impact approximately 26.5 ha (65.2 ac) of non-ADID

[5] Each wetland identified in the field was assigned a unique value, prefaced by the route designate (i.e., 45-1= Wetland #1, US 45). The wetlands were numbered sequentially as they were encountered in the field.

[6] Wetland impacts for the No-Action Alternative (Baseline) were estimated using typical project right-of-way widths for the proposed improvements. No field verifications were conducted in connection with the No-Action improvements, therefore, the total number of wetlands and wetland acreage impact is an estimate based on the best available data.

TABLE 4-21

Potential ADID Impacts for the No-Action Alternative (Baseline)

Roadway Segment	ADID Description	ADID Size ha (ac)	Potential ADID Impact ha (ac)	% Impacted	ADID Functions Identified by Lake County ADID Study	Impacts
Butterfield Road	ADID 113	37.6 (92.9)	0.3 (0.8)	0.8	• Shoreline/Bank Stabilization	Minimal
					• Sediment/ Toxicant Trapping	Minimal
					• Nutrient Removal	Minimal
IL 21	ADID 94 Liberty Prairie	55.4 (137.0)	< 0.01	--	• Threatened & Endangered Species Habitat	Minimal
					• Sediment-toxicant retention	Minimal
					• Stormwater storage	Minimal
					• High Quality Plant Community	Minimal
	ADID 96 Tributary to Bull Creek	6.4 (15.9)	0.15 (0.4)	2.3	• High quality stream	Minimal
					• Stormwater storage	Minimal
					• Sediment-Toxicant Retention	Minimal
	ADID 106 Bull Creek	0.6 (1.6)	0.4 (0.9)	66.7	• Threatened & Endangered Species Habitat	Loss of Habitat
					• Stormwater storage	Loss of storage capability
					• Sediment/toxicant retention	Loss of Retention
IL 22	ADID 168	2.3 (5.6)	0.02 (0.05)	0.8	• High Quality Wildlife Habitat	Minimal Loss of habitat
	ADID 169	17.2 (42.4)	0.9 (2.1)	5.2	• Presence of T&E Plant Species	Potential loss of supporting habitat
	ADID 170 Reed-Turner Nature Preserve [a]	87.9 (217.3)	0.6 (1.4)	0.6	• Threatened & Endangered Species Habitat	Minimal
					• Shoreline-bank stabilization	Minimal
					• Sediment-toxicant retention	Minimal
					• Nutrient removal and transport	Minimal
	ADID 173 Flint Creek	54.3 (134.1)	0.06 (0.2)	0.11	• Shoreline/Bank Stabilization	Minimal
					• Sediment/ Toxicant Trapping	Minimal
					• Nutrient Removal	Minimal
	ADID 175	30.8 (76.1)	0.6 (1.4)	1.9	• Presence of T&E Plant Species	Minimal Loss of Habitat
					• Stormwater Storage	Minimal
					• Sediment/ Toxicant Trapping	Minimal
Lake Cook Road	ADID 187	3.8 (9.5)	0.8 (1.9)	21.1	• High Quality Plant Community	Loss of Habitat
					• Stormwater Storage	Loss of storage
					• Sediment/ Toxicant Trapping	Loss of retention
Pulaski Road	ADID 91	49.4 (122.0)	1.1 (2.7)	2.2	• High Quality Plant Community	Minimal loss of Habitat
					• Sediment/toxicant retention	Minimal retention loss
Rollins Road	ADID 44 Fourth Lake/ Mill Creek Complex	313.9 (775.7)	0.4 (1.0)	0.13	• Presence of T&E Plant Species	Minimal
					• INAI Site	Minimal
					• High Quality Plant Community	Minimal
					• Shoreline/Bank Stabilization	Minimal
					• Sediment/ Toxicant Trapping	Minimal
					• Nutrient Removal	Minimal
	ADID 61 Rollins Savanna	5.7 (14.2)	0.01(0.03)	0.17	• High Quality Plant Community	Minimal
					• Stormwater Storage	Minimal
					• Sediment/ Toxicant Trapping	Minimal
TOTAL		**665.3 (1,644.3)**	**5.3 (12.9)**	**0.8**		

[a] Identified as the Reed Turner Nature Preserve ADID site. Nature Preserve not impacted.

wetlands based on the LCWI. Table 4-22 summarizes the potential impacts for each roadway improvement for the No-Action Alternative (Baseline).

Most of the potentially impacted non-ADID wetlands are located in the Des Plaines River Watershed. Only wetland impacts associated with improvements along the western portions of IL 22 and Peterson Road are located in the Fox River Watershed. Field reconnaissance was not conducted for wetlands under this alternative; therefore, no assessment of quality, size, and function for these wetlands is available. Based on available data, wetland impacts are concentrated along four of the proposed improvements. The proposed improvements to IL 22, I-94, Buffalo Grove Road and US 45 would have the potential to impact about 18.4 ha (45.5 ac) of wetlands, totaling approximately 70 percent of all wetland impacts for this alternative.

IL 53 Freeway/Tollway Alternative

The IL 53 Freeway/Tollway Alternative would potentially impact 118 wetland sites totaling approximately 37.1 ha (91.8 ac). Figure 4-17 shows the location of ADID and non-ADID wetlands potentially impacted by this alternative. The estimated potential direct loss of these wetland resources is based upon the right-of-way requirements for the IL 53 Freeway/Tollway Alternative. Detailed discussions of ADID and non-ADID impacts follow.

ADID Wetlands. Five ADID wetlands totaling approximately 3.5 ha (8.6 ac) (CH2M HILL 1999; GIS database) within the Des Plaines River Watershed would potentially be directly impacted by the IL 53 Freeway/Tollway Alternative. These ADID wetlands are generally located in the north-south segment of the alternative with one ADID wetland along the east-west segment (IL 120). The ADID wetland impacts from this alternative would total less than 0.06 percent of the total ADID wetland acreage in the county (presently there are 203 designated ADID wetlands in the county totaling 5,585 ha (13,800 ac)). The IL 53 Freeway/Tollway Alternative would transversely cross two ADID wetland/stream complexes. These ADID wetland resources are ADID number 170 (Wetland Number 53-19) and ADID Number 143 (Wetland Numbers 53-43, 53-67, 83-19, and 83-40). Because both of these ADID complexes are linear, the IL 53 alignment would bridge these locations to avoid fragmentation, thereby minimizing impacts in these areas to shading and limited filling. Bridging these areas would avoid impacts to natural stream flow and habitat continuity that could occur with an at-grade facility. Table 4-23 (on the following page) summarizes the potential direct impacts to ADID wetlands for the IL 53 Alternative. Appendix D shows the comparison of ADID wetland impacts for the three alternatives, and gives a detailed description of the ADID

TABLE 4-22

No-Action Alternative (Baseline) Scenario; Potential Non-ADID Wetland Impacts

Roadway Segment	Potential Wetland Impacts	Roadway Segment	Potential Wetland Impacts
Buffalo Grove Road	2.4 ha (5.9 ac)	Martin Luther King Road	0.3 ha (0. 7 ac)
Busch Parkway	0.6 ha (1.4 ac)	Bradley Road (new)	1.5 ha (3.7 ac)
Butterfield Road	0.2 ha (0.6 ac)	Midlothian Road (new)	0.1 ha (0.1 ac)
Hunt Club Road	0.3 ha (0.7 ac)	Pulaski Road (new)	0.1 ha (0.2 ac)
I-94	5.1 ha (12.6 ac)	Peterson Road	0.3 ha (0.7 ac)
IL 21	0.6 ha (1.4 ac)	Quentin Road	1.2 ha (3.0 ac)
IL 22	9.2 ha (22.7 ac)	Rollins Road	0.8 ha (2 ac)
IL 60	0.4 ha (1.1 ac)	US 45	1.7 ha (4.3 ac)
Lake-Cook Road	0.5 ha (1.2 ac)	Washington Street	1.2 ha (2.9 ac)
TOTAL	**26.4 ha (65.2 ac)**		

CH2M HILL 1999, LCTIP GIS Database.

wetlands and their potential impacts from construction.

In addition to direct impacts caused by filling or alteration, minimal functional loss of wetland resources is anticipated. Table 4-23 summarizes the potential impacts to wetland functions from this alternative. All five ADID wetlands impacted by this alternative would incur minimal loss of wildlife habitat. Additional functional impacts such as shoreline stabilization, sediment/toxicant trapping, and nutrient removal are considered to arise to a lesser extent. ADID wetland 180 would lose approximately 3 percent of its overall size. This contributes to slightly higher levels of functional impact, and to loss of habitat in particular.

Non-ADID Wetlands. The 113 non-ADID wetlands potentially impacted by the IL 53 Alternative total approximately 34 ha (83.2 ac)

TABLE 4-23
IL 53 Freeway/Tollway ADID Impact Summary [a]

Route	ADID Description	ADID Size ha (Ac)	Potential ADID Impact ha (Ac)	% Impacted	ADID Functions Identified by Lake County ADID Study	Impacts to Functions	Community Type
IL 53	ADID 143 Indian Creek/Kildeer Creek LCTIP Nos. 53-43, 53-67, 83-19, 83-40	63.0 (155.6)	0.7 (1.6)	1.1	• Threatened & Endangered Species Habitat • Shoreline-bank stabilization • Sediment/toxicant retention	Some Loss of Habitat Some loss of bank stabilization Some Loss of sediment /toxicant retention	Sedge Meadow Emergent Marsh
IL 53	ADID 169 LCTIP 53-21, 53-22	42.4 (104.8)	0.3 (0.62)	0.7	• Threatened & Endangered Species Habitat	Minimal Loss of Habitat	Sedge Meadow
IL 53	ADID 170 Reed-Turner Nature Preserve [b] LCTIP 53-19	87.8 (217.0)	0.2 (0.5)	0.2	• Threatened & Endangered Species Habitat • Shoreline-bank stabilization • Sediment-toxicant retention • Nutrient removal and transport	Minimal Loss of Habitat Minimal Minimal Minimal	Sedge Meadow
IL 53	ADID 180 Buffalo Creek Complex LCTIP Nos. 53-7, 53-8, 53-11	63.5 (157.0)	2.2 (5.4)	3.5	• Threatened & Endangered Species Habitat • Shoreline-bank stabilization • Sediment-toxicant retention • Nutrient removal and transport	Some Loss of Habitat Some Loss of bank stabilization Some Loss of sediment /toxicant retention Some Loss of nutrient removal/transport	Sedge Meadow Emergent marsh
IL 120	ADID 200 LCTIP 120-4	7.4 (18.3)	0.1 (0.3)	1.4	• Threatened & Endangered Species Habitat • Shoreline-bank stabilization • Sediment/toxicant retention	Minimal Loss of Habitat Minimal Minimal	Deep Marsh
Total		**264.1 (652.7)**	**3.5 (8.4)**	**1.3**			

[a] Lake County ADID Study
[b] Identified as the Reed Turner Nature Preserve ADID site. Nature Preserve not impacted.

(CH2M HILL 1999; GIS database). These wetlands are a mixture of open marsh, emergent, or forested wetlands. A majority of the wetlands identified within this alternative were located along the existing IL 53 right-of-way. A more detailed assessment of wetland impacts is presented in Section 4.3.3.2.

IL 83/US 45 with US 12 Alternative

The IL 83/US 45 with US 12 Alternative would impact 196 wetland sites with a potential direct impact to approximately 23.4 ha (57.7 ac) of wetlands (CH2M HILL 1999; GIS database). Figure 4-18 shows the location of ADID and non-ADID wetlands potentially impacted by this alternative.

ADID Wetlands. Thirteen ADID wetland sites, all within the Des Plaines River Watershed, would potentially be impacted by this alternative, totaling approximately 1.7 ha (4.2 ac) or less than 0.03 percent of the total ADID wetland acreage in Lake County, 5,585 ha (13,800 ac). Table 4-24 (on the following page) summarizes the potential impacts to ADID wetlands within this alternative. These ADID wetlands are generally scattered uniformly along most of the improvements comprising this alternative. Though this alternative includes mostly widening of existing roadways, many ADID impacts are located along roadway edges. Therefore, ADID wetland impacts tend to be small in size and do not include bisection. Appendix D gives a detailed description of the ADID wetlands and their impacts from this alternative.

In addition to potential direct impacts caused by filling or alteration, minimal functional loss of wetland resources is anticipated. Table 4-24 summarizes the potential impacts to wetland functions from this alternative. A majority of the ADID wetlands would have very minimal impacts to functional capacity. Of the functions listed in Table 4-24, mitigation would be most difficult for habitat losses.

A majority of the potential ADID wetland impacts occur along the I-94 and IL 83 improvements for this alternative. These two improvements account for 1.2 ha (2.9 ac) or over 60 percent of ADID wetland impacts.

Non-ADID Wetlands. The 183 non-ADID wetlands potentially impacted by the IL 83/US 45 with US 12 Alternative total 21.6 ha (53.5 ac) (CH2M HILL 1999; GIS database). These wetlands are a mixture of open marsh, emergent, or forested wetlands. A more detailed assessment of wetland impacts is presented in Section 4.3.3.2.

4.3.3.2 Wetland Functional Assessment Methodology

A wetland functional assessment was developed for the study, drawing from established methods and adapted to be compatible with available data, and the planning level field reconnaissance. The assessment was performed for the wetlands within the study area for both build alternatives based on data collected in the field and from several published sources. The assessment employed a scoring system that assigned points to a wetland based on the value of specific overall functions. Points were assigned per wetland function and added to derive the total score per wetland. The value or weighting (scores assigned) for a given wetland function is based in part on established requirements for mitigating impacts to wetlands expressing these functions. The scores were then divided into three classes; Class I being the most functional (highest quality) wetlands and Class III being the least functional (low-quality) wetlands.[7] The range of wetland scores within the study area was 1 – 28.5. Categorization of wetland quality classes is as follows:

- Class I: The top third of wetland scores (20 – 28.5),
- Class II: The middle third of wetland scores (11 - 19),
- Class III: The lower third of wetland scores (1 – 10).

[7] The methodology was developed by CH2M HILL, based on Minnesota Interagency Wetlands Group. *Minnesota Routine Assessment Method for Evaluating Wetland Functions – Version 2.0*. 1996.

TABLE 4-24
IL 83/US 45 with US 12 Potential ADID Impact Summary [a]

Route	ADID Description	ADID Size ha (ac)	Potential ADID Impact	% Impacted	ADID Functions Identified by Lake County ADID Study	Impacts to Functions	Community Type
I-94	ADID 91 LCTIP 94-11	49.6 (122.5)	0.3 (0.7)	0.6	• High Quality Plant Community • Sediment/toxicant retention	Minimal Habitat Loss Minimal	Cattail Marsh Sedge Meadow
IL 21	ADID 94 Liberty Prairie LCTIP 21-28	55.4 (137.0)	0.02 (0.04)	0.03	• Threatened & Endangered Species Habitat • Sediment-toxicant retention • Stormwater storage • High Quality Plant Community	Minimal Habitat Loss Minimal Minimal Minimal	Wet Prairie
IL 21	ADID 96 Tributary to Bull Creek LCTIP 21-18	6.5 (15.9)	0.1 (0.2)	1.5	• High quality stream • Stormwater storage • Sediment-Toxicant Retention	Minimal Habitat Loss Minimal Minimal	Stream complex
I-94	ADID 99 Headwaters of the Middle Fork, North Branch Chicago River LCTIP 94-10	3.4 (8.6)	0.01 (0.03)	0.3	• High Quality Wildlife Habitat • Sediment-toxicant retention	Minimal Habitat Loss Minimal sediment/ toxicant retention Loss	Emergent cattail marsh
IL 21	ADID 106 Bull Creek LCTIP Nos. 21-17, 21-28	1.6 (3.9)	0.1 (0.2)	6.25	• Threatened & Endangered Species Habitat • Stormwater storage • Sediment/toxicant retention	Some Loss of Habitat Minimal Minimal	Stream Complex
I-94	ADID 108 LCTIP 94-9	11.7 (28.9)	0.4 (1.0)	3.5	• Threatened & Endangered Species Habitat • Sediment/toxicant retention	Some Loss of Habitat Minimal	Sedge Meadow Wet mesic Prairie
I-94	ADID 128 LCTIP 94-5	48.3 (119.4)	0.04 (0.1)	0.08	• High Quality Plant Community • Sediment-toxicant retention	Minimal Habitat Loss Minimal	Sedge Meadow
IL 83	ADID 143 Indian Creek/Killdeer Creek LCTIP Nos. 83-19, 83-40	63.0 (155.6)	0.2 (0.6)	0.3	• Threatened & Endangered Species Habitat • Shoreline-bank stabilization • Sediment/toxicant retention	Minimal Habitat Loss Minimal Minimal	Sedge Meadow Emergent Marsh
IL 83	ADID 151 LCTIP 83-27	39.4 (97.4)	0.2 (0.4)	0.5	• Shoreline-bank stabilization • Sediment-toxicant retention	Minimal Minimal	Wetland Stream Complex
IL 83	ADID 158 Indian Creek LCTIP 83-11	58.6 (144.8)	0.01 (0.03)	0.02	• Shoreline-bank stabilization • Sediment/toxicant retention	Minimal Minimal	Stream Complex
US 12	ADID 183 LCTIP 12-4	36.7 (90.6)	0.3 (0.6)	0.8	• Shoreline-bank stabilization • Sediment/toxicant retention • Nutrient removal and transport	Minimal Minimal Minimal	Buffalo Creek
IL 60	ADID 198 MacArthur Woods LCTIP 60-11, STM-27	14.8 (36.67)	0.1 (0.2)	0.68	• High Quality Plant Community • Sediment/toxicant retention • Stormwater storage	Minimal Minimal Minimal	Northern Flatwoods
IL 120	ADID 200 LCTIP 120-4	7.4 (18.3)	0.1 (0.2)	1.4	• Threatened & Endangered Species Habitat • Shoreline-bank stabilization • Sediment/toxicant retention	Minimal Habitat Loss Minimal Minimal	Deep Marsh
TOTAL		**396.4 (979)**	**1.9 (4.3)**	**0.5**			

[a]Lake County ADID Study

The four wetland functions used in the process are described below.

Presence of federal-listed and/or state-listed species. Wetland reconnaissance fieldwork performed for the LCTIP was not intended to assess presence of federal- or state-listed species. Rather data for federal and state threatened and endangered species were gleaned from published literature sources such as Biological Surveys (various) performed by the Illinois Natural History Survey (INHS), Illinois Department of Conservation (IDOC – now IDNR) Technical Report No. 1: *Northeastern Illinois Wetland Survey for Endangered and Threatened Birds; A Summary of Field Data: 1980-1989*, and correspondence from the Illinois Department of Natural Resources Natural Heritage (database search dated July 6, 2000).

Based on the IDNR database search (July 6, 2000), element occurrences within the study area are summarized in Table 4-25. Review of other published sources did not reveal any element occurrences within the study area that were not reported by the IDNR database search.

Wetlands known to provide refuge for any federally or state listed species were assigned 5.5 points and those wetlands not known to provide refuge for any listed species were assigned 0 points. Points assigned for this function are intended to mirror statewide mitigation requirements, e.g. 5.5:1, for impacted wetlands that harbor listed species. Mitigation requirements for a given resource generally reflect how a wetland function is valued.

Wildlife habitat. Wildlife habitat was assessed by assigning one point per vegetative strata observed during wetland determinations, and assigning a wetland size class (0-8) to each wetland potentially affected. Strata considerations included herbaceous, shrub/sapling, tree, vines, and submergents. If dominant trees were dead, they were included as valuable habitat for wildlife species.

The presence of a larger number of strata and a larger wetland size are attributes that increase ecological niches available to wildlife. Based on coordination with the US Army Corps of Engineers (USACOE), it was determined that although overall wetland size is important, small to moderate size wetlands

TABLE 4-25
IDNR Element Occurrences in or Near Wetlands within the Study Area

Element Occurrence	Adjacent to Wetland # [a, b]
Yellow-headed Blackbird	120-5, 120-23
Crawford's sedge	120-23
Sandhill crane	120-5, 53-7, 53-8
Pied-billed grebe	120-5, 53-43
Least bittern	120-5
Iowa darter	120-342g, 21-19
Oak Grove Botanical Area (INAI)	94-12
Eastern prairie fringed orchid	137-3, 94-11, 94-13
Mountain blue-eyed grass	12-4
±7 threatened and endangered species	120-6, 60-4, 60-9, STM-26, STM-27, STM-28, 21-1
Heron rookery	53-43

[a] 5.5 points were assigned to these wetlands in the wetland functional assessment

[b] Wetland numbers were assigned to wetlands identified during field verification.

in a disturbed environment serve various functions. As a result, the scoring of wetland size does not distinguish differences for wetlands over 20 hectares (50 acres) in size, and attempts to reflect the true value of smaller wetlands in an urbanized area. For this methodology, it is assumed that wetlands of all sizes greater than 20 hectares (50 acres) provide similar levels of ecological function. Size classes are described in Table 4-26.

Floristic diversity. Lists of dominant vegetation were developed during wetland field verifications for each wetland within the study area of the two build alternatives. Plant species lists were only intended for approximation of the wetland boundary and do not comprise a complete floristic list. The use of the Floristic Quality Assessment (FQA) method as developed by Wilhelm et al. (1994) is inappropriate to assess cursory species lists. A FQA would be developed after the selection of a preferred alternative.

For purposes of this study, floristic diversity was assessed by counting the number of living dominant plant species and subtracting all invasive plants, mowed turf grass, and row crop plants. Filamentous algae, prevalent in some wetlands within the study area, was not included in the calculation of the floristic diversity index. Plant species considered as invasive observed during fieldwork include purple loosestrife (*Lythrum salicaria*), reed canarygrass (*Phalaris arundinacea*), giant reed (*Phragmites australis*), garlic mustard (*Alliaria petiolata*), common buckthorn (*Rhamnus cathartica*), common burdock (*Arctium minus*), smooth brome (*Bromus inermis*), corn (*Zea mays*), honeysuckle (*Lonicera* spp.), and Canada thistle (*Cirsium arvense*). Invasive dominants were subtracted from calculation of floristic diversity because they are detriments to floristic diversity. It should be noted that all plants, invasive or not, were included in calculation of the strata class (see Wildlife Habitat function of wetlands) because wildlife would use invasive plant species to some extent for cover and food sources.

Recreation (Generally Passive)/Education Potential. Wetlands in or adjacent to specially designated lands are generally highly valued resources. For purposes of this study, specially designated lands include forest preserves, Illinois Natural Areas Inventory (INAI) sites, and Illinois Nature Preserves. Varying points were assigned to wetlands based on their adjacency to these different specially designated lands categories as follows:

- Wetlands adjacent to or within Illinois Nature Preserves were assigned 10 points.
- Wetlands adjacent to or within INAI sites were assigned 5.5 points.
- Wetlands adjacent to or within forest preserves were assigned 1 point.
- Wetlands not adjacent to or within any specially designated lands were assigned 0 points.

Point assignments for wetlands near or in different classifications of specially designated lands generally mirror mitigation requirements for impacts to these important wetlands.

Not all wetland functions were individually assessed for this study. Functions, such as food chain support and uniqueness, were not assessed. The food chain support function is too complex to be assessed based on the level of detail on the information available for this study. Unique wetlands, such as bogs, fens (northern peatlands), seeps or springs were not

TABLE 4-26
Wetland Size Classes Used in Wetland Functional Assessment

Size Class	0	1	2	3	4	5	6	7	8
Hectare range	0–0.1	0.1 - 0.2	0.2 - 0.4	0.4 - 0.8	0.8 - 2.0	2.0 - 4.0	4.0 – 8.0	8.0 - 20	>20
Acre range	0–0.25	0.25–0.49	0.50 – 0.99	1.0–1.99	2.0 – 4.9	5.0 – 9.9	10–19.9	20–49.9	>50

identified for each alternative during the field verification exercise. Therefore these functions were not assessed.

Similarly, functions such as aquatic habitat, sediment/toxicant trapping, and floodwater/stormwater attenuation were not considered individually due to the complex nature of these functions compared to the data available for this study. These last three functions were considered during the weighting process for wetland size classification as they generally would be considered a function of wetland size. Larger and more diverse wetland complexes generally provide these functions better than wetland complexes of smaller size.

4.3.3.3 General Functional Wetland Assessment

The wetland impacts were assessed for the build alternatives using the wetland functional assessment methodology. Wetlands potentially impacted by the No-Action Alternative were not field-verified; therefore, the wetland functional assessment methodology could not be applied. The impacts for the build alternatives are summarized below.

The IL 53 Freeway/Tollway Alternative would affect a total of 37.1 hectares (91.8 acres) of wetlands. Roughly 12.5 percent, 4.7 ha (11.5 ac) are Class I (high quality) wetlands, 26.8 percent, 10.0 ha (24.6 ac) are Class II wetlands, and 60.7 percent, 22.5 ha (55.7 ac) of the total wetland impacts are Class III wetlands.

The IL 53 Freeway/Tollway Alternative would affect 118 individual wetlands. Of the affected wetlands, 12 field verified wetlands (representing 5 ADID complexes) are designated as ADID. Of the 12 field verified wetlands, wetlands 53-7, 53-11 and 53-43 are Class I, wetlands 53-8, 53-19, 53-21, 53-22, 53-67, 83-19, and 83-40 are Class II, and wetland 120-4 is Class III. Affected wetlands along the IL 53 Freeway/Tollway Alternative identified as Class I that are not designated as ADID include wetlands 120-5 and 120-6.

The IL 83/US 45 with US 12 Alternative would affect 23.4 hectares (57.7 acres) of wetlands. With respect to the wetland functional assessment methodology used for this project, 3.8 percent, 0.9 ha (2.2 ac) are Class I wetlands, 60.8 percent, 14.3 ha (35.1 ac) are Class II, and 35.4 percent, 8.3 ha (20.4 ac) are Class III.

The IL 83/US 45 with US 12 Alternative would affect a total of 196 individual wetlands. Of those, 21 field verified wetlands (representing 13 ADID complexes) are designated in part as ADID. Of the 21 field verified (ADID designated) wetlands, wetlands STM-27, 94-10, and 94-11 are Class I wetlands, wetlands 12-4, 21-18, 21-28, 83-11, 83-19, 83-27, 83-40, 94-5, and 94-9 are Class II, and wetlands 21-17, 60-11, and 120-4 are Class III. Affected wetlands along the IL 83/US 45 with US 12 Alternative identified as Class I (high quality) that are not designated as ADID include wetlands STM-26, STM-28, 21-1, 60-1, 60-5, 60-9, and 120-6.

Wetland Functional Assessment-IL 53 Freeway/Tollway Alternative

The results of the wetland functional assessment were also summarized for the major watershed within the project area. The purpose of this summary is to gain some perspective on both the amount and quality of wetlands affected that may lead regulatory agencies to more effective mitigation of the wetland impacts. Again, information is summarized for the two build alternatives only. Tables E-4 through E-6 in Appendix E, summarize wetland impact data for the IL 53 Freeway/Tollway Alternative, analyzed with respect to watershed, roadway segment, and wetland quality class (per field-based wetland functional assessment methodology).

Fox River Watershed. Roughly 5.3 hectares (13.1 acres) of wetland impacts would occur along parts of the IL 53 Freeway/Tollway Alternative that lie within the Fox River Watershed. Of those impacts, 46 percent are Class II wetlands, and 54 percent are Class III wetlands. All Fox River Watershed wetlands are located along IL 120. There are no Class I wetlands located within this watershed.

Des Plaines River Watershed. Roughly 31.8 hectares (78.7 acres) of wetlands would be affected along parts of the IL 53 Freeway/Tollway Alternative that lie within the Des Plaines River Watershed. Of those impacts, 14.6 percent are Class I wetlands, 23.6 percent are Class II wetlands, and 61.8 percent are Class III wetlands.

Approximately half of the Class I impacts are located along the eastern half of IL 120 near the Almond Marsh complex. Most of the remaining Class I impacts are located near the Indian Creek complex.

Lake Michigan Watershed. There are no wetland impacts proposed for portions of the IL 53 Freeway/Tollway Alternative that lie within the Lake Michigan Watershed.

Wetland Functional Assessment-IL 83/US 45 with US 12 Alternative

Fox River Watershed. Approximately 0.4 hectare (1.1 acres) of wetland impacts would occur along parts of the IL 83/US 45 with US 12 Alternative that lie within the Fox River Watershed. Of the total wetland impacts, 8 percent are to Class II wetlands and 92 percent are Class III wetlands. There are no Class I wetlands located in this watershed for this alternative.

Tables E-1 through E-3 in Appendix E, summarize wetland impact data for the IL 83/US 45 with US 12 Alternative, analyzed with respect to watershed, roadway segment, and Wetland Quality Class (per field-based wetland functional assessment methodology).

Des Plaines River Watershed. Roughly 22.9 hectare (56.6 acre) of wetland impacts would occur along the part of the IL 83/US 45 with US 12 Alternative that lie within the Des Plaines River Watershed. Of those, 3.9 percent are Class I wetlands, 61.9 percent are Class II wetlands, and 34.2 percent are Class III wetlands. Impacts to Class I wetlands for this alternative are distributed relatively evenly among St. Mary's Road, IL 120, IL 21, IL 60 and Interstate 94.

Lake Michigan Watershed. There are no proposed impacts to wetlands along portions of the IL 83/US 45 with US 12 Alternative that lie within the Lake Michigan Watershed.

4.3.3.4 Summary

All project alternatives would have unavoidable wetland impacts. The IL 53 Freeway/Tollway Alternative would have the largest area of overall wetland impacts. Based on the field-verified wetland functional assessment methodology, the IL 53 Freeway/Tollway Alternative would have a higher proportion of high quality wetlands (Class I) impacted, however, fewer impacts to moderate quality (Class II) wetlands than the IL 83/US 45 with US 12 Alternative. Combining the high and moderate quality wetlands, the IL 83/US 45 with US 12 Alternative would impact a higher percentage and larger amount of these wetlands than the IL 53 Freeway/Tollway Alternative. Almost two-thirds of the wetlands impacted for the IL 53 Freeway/Tollway Alternative are considered low quality (Class III) wetlands, whereas only approximately one-third of the wetlands impacted as a result of the IL 83/US 45 with US 12 Alternative are considered Class III wetlands. The area of wetland impact for any of the alternatives is an issue that would be the subject of greater examination for the preferred alternative. Continued efforts would be made to avoid or minimize the impact with further project refinements.

From a countywide perspective, the impacts to wetlands are relatively small. Compared to the total wetlands in Lake County (18,500 ha, or 45,700 ac) the alternatives impact from 0.17 percent for the No-Action Alternative (Baseline) to 0.20 percent for the IL 53 Freeway/Tollway Alternative, of the total wetlands identified by the LCWI. Table 4-27 (on the following page) summarizes impacts to wetlands per alternative, including a summary of qualitative assessment per alternative and per watershed.

Impacts would also occur to wetlands from roadway operations after construction. This includes stormwater runoff from roadways that carries typical roadway pollutants into adjacent water bodies or wetlands. Other impacts occur from roadway deicing

procedures, which introduce sodium chloride into the surrounding areas. The introduction of roadway pollutants including sodium chloride can affect vegetation in proximity to the roadway. Impacts of this nature would not be as substantive for improvements along existing roadways, since these areas are already subject to operational impacts.

For new roadways, the introduction of roadway pollutants can be more substantive than for improvements to existing roadways. This is a result of introducing roadway pollutants to areas that previously received limited impacts from roadways. This would present more impacts to areas along the IL 53 corridor. It should be noted that some roadway pollutants are already entering these areas from cross-streets and local roads adjacent to the existing right-of-way. Different measures can be taken to reduce roadway operation impacts such as alternative deicing materials, routing of stormwater runoff through vegetated swales or sediment basins or by the use of barriers, which could include pollutant tolerant vegetation or other structural elements. Detailed mitigation measures would be designed specifically for the preferred alternative. Additional information on roadway runoff impacts is included in Section 4.3.2, *Water Quality and Water Resources*.

Commonly, regulatory agencies also consider the effects of the direct impacts on portions of impacted wetlands outside the project right-of-way. The consideration of impact to the entire wetland attempts to evaluate the overall impact to wetland functions. A final determination of wetland impacts would be fully addressed after selection of a preferred alternative, completion of formal wetland delineations, and coordination with US Army Corps of Engineers, US Fish and Wildlife Service, US Environmental Protection Agency, Illinois Department of Natural Resources, and the Lake County Stormwater Management Commission.

4.3.4 Floodplain Encroachments

Potential floodplain encroachments were identified by examining Flood Insurance Study (FIS) maps published by Federal Emergency Management Association (FEMA). Guidance from the Lake County Stormwater Management Commission (SMC) was applied in determining storage

TABLE 4-27
Summary of Wetland Impacts

	No-Action (Baseline)	IL 53 Freeway/Tollway		IL 83/US 45 with US 12	
Total Wetland Impacts	31.6 ha (78.1 ac)	37.1 ha (91.8 ac)		23.4 ha (57.7 ac)	
ADID Impacts	5.3 ha (12.9 ac)	3.5 ha (8.6 ac)		1.9 ha (4.3 ac)	
Non-ADID Impacts	26.5 ha (65.1 ac)	33.6 ha (83.2 ac)		21.6 ha (53.5 ac)	
		Percent of impacts	Size	Percent of impacts	Size
Class I	--[a]	12.5	4.7 ha (11.5 ac)	3.8	0.9 ha (2.2 ac)
Class II	--[a]	26.8	10.0 ha (24.6 ac)	60.8	14.3 ha (35.1 ac)
Class III	--[a]	60.7	22.5 ha (55.7 ac)	35.4	8.3 ha (20.4 ac)
Fox River Watershed	--[a]	5.3 ha (13.1 ac)		0.4 ha (1.1 ac)	
Des Plaines Watershed	--[a]	31.8 ha (78.7ac)		22.9 ha (56.6 ac)	

[a] No qualitative assessment conducted for No-Action Alternative (Baseline)

requirements for both floodplain encroachments and added impervious areas associated with the alternatives. FIS floodplain locations were identified directly from the maps. Potential encroachments on SMC floodplains would be determined in future phases of work for the preferred alternative.

The following subsections discuss the potential floodplain encroachments and other drainage concerns for each alternative, including potential mitigation measures. Tables describing floodplain encroachments, added impervious areas, storage requirements, and potential storage locations within each drainage reach are shown in Appendix F. Transverse (crossing) and longitudinal (edge) encroachments are differentiated, since longitudinal encroachments often result in more complex floodplain effects and greater reduction in conveyance. Longitudinal encroachments typically involve more fill, based on a longer zone of impact. Longitudinal impacts are generally considered to be more avoidable than transverse encroachments, based on the potential for design modifications.

Mitigation of floodplain encroachments is required in Lake County through provision of detention and compensatory storage in the area of impact (Lake County Stormwater Management Commission, Lake County Watershed Development Ordinance, amended August 10, 1999). Compensatory storage is a volume of storage within or adjacent to a regulatory floodway or floodplain used to balance the loss of natural flood storage capacity within the floodplain. Detention storage is a volume of storage used to maintain stormwater release rates at or below levels after the addition of relatively impervious areas.

4.3.4.1 No-Action Alternative (Baseline)

The roadway improvements included in the No-Action Alternative (Baseline) pass through three major watersheds: the Fox River Watershed, the Des Plaines River Watershed, and the Chicago River Watershed. Subwatersheds involved in these areas include Flint Creek, Buffalo Creek, Aptakisic Creek, Lower Des Plaines River, Indian Creek, Bull Creek, Mill Creek, Upper Des Plaines River, Squaw Creek, Middle Fork, Skokie River, and West Fork.

The No-Action Alternative (Baseline) would involve 38 FIS floodplains, with a total of 6.9 ha (17.0 ac) of encroachment. Of these 38 locations, 28 would involve the extension of existing culverts or bridges at transverse crossing locations where roadway widening would occur. Encroachment at these locations would be 3.9 ha (9.6 ac). One transverse involvement would occur where a roadway would be constructed along a new alignment. This would occur along the Bradley Road extension, and would have an encroachment area of 0.53 ha (1.3 ac). Finally, nine longitudinal encroachments would occur, all at locations where roadways would be widened, with a total area of 2.5 ha (6.1 ac). Design alternates to avoid or minimize longitudinal impacts would need to be investigated before implementation.

In addition to floodplain effects, the combined roadway improvements for the No-Action Alternative (Baseline) would add 135 ha (333.0 ac) of impervious area. Based on floodplain encroachments and impervious areas, the No-Action Alternative (Baseline) would require 8.3 ha (20.5 ac) of compensatory storage and 14.3 ha (35.3 ac) of detention storage. A preliminary concept for locations of detention and compensatory storage is provided in Appendix F. The required storage could be provided near the areas of encroachment.

4.3.4.2 IL 53 Freeway/Tollway Alternative

The IL 53 Freeway/Tollway Alternative passes through two major watershed areas: the Fox River Watershed and the Des Plaines River Watershed. Subwatersheds involved in these areas include Fish Lake Drain, Squaw Creek, Mill Creek, Bull Creek, Buffalo Creek, Indian Creek, and the Upper Des Plaines River.

This alternative encroaches on 10 FIS floodplains with a total area of 13.0 ha (32.1 ac). All would involve transverse encroachments along the 6-lane roadway to be

constructed on new alignment. No longitudinal encroachments are identified. The IL 53 Freeway/Tollway Alternative would also involve approximately 182 ha (449.0 ac) of additional impervious area. Based on these effects, the IL 53 Freeway/Tollway Alternative would require 15.6 ha (38.5 ac) of compensatory storage and 18.7 ha (46.3 ac) of detention storage. A preliminary concept for locations of detention and compensatory storage is provided in Appendix F. The required storage could be provided near the areas of encroachment.

4.3.4.3 IL 83/US 45 with US 12 Alternative

The IL 83/US 45 with US 12 Alternative passes through three major watershed areas: the Fox River Watershed, the Des Plaines River Watershed, and the Chicago River Watershed. Subwatersheds involved in these areas includes: Slocum Lake Drain, Tower Lake Drain, Flint Creek, Buffalo Creek, Aptakisic Creek, Lower Des Plaines River, Indian Creek, Bull Creek, Mill Creek, Upper Des Plaines River, Squaw Creek, and Middle Fork.

This alternative encroaches on 33 FIS floodplains with a total area of 5.9 ha (14.6 ac). Seventeen of those locations would involve extending culverts or bridges at transverse crossing locations where roadway widening would be required. The total encroachment at these locations would be 3.7 ha (9.2 ac). Another four encroachments would occur at transverse crossing locations, where roadway would be constructed along new alignment. These would occur along the section of IL 83/US 45 north of IL 60 (Mundelein Bypass), and have an impact area of 0.3 ha (0.8 ac). Finally, 12 longitudinal encroachments would occur, all at locations where roadways would be widened, with a total encroachment area of 1.8 ha (4.5 ac). Design alternates to avoid or minimize longitudinal impacts would need to be investigated should this become the preferred alternative. Placing widening on the side opposite the floodplain should be investigated as an option. This alternative also would involve 163.0 ha (403.0 ac) of additional impervious area. Based upon the floodplain encroachments and added impervious area for this alternative, 7.1 ha (17.5 ac) of compensatory storage and 17.1 ha (42.3 ac) of detention storage would be required. A preliminary concept for locations of detention and compensatory storage is provided in Appendix F. The required storage could be provided near the areas of encroachment.

4.3.4.4 Summary of Floodplain Encroachments

The number of floodplain encroachments and the added impervious area varies with each alternative. Generally, the regulatory requirements for compensatory storage and stormwater detention could be satisfied for each alternative near the area of impact (concept plans in Appendix F). Actual compliance with these requirements would be determined by detailed hydraulic analysis during future phases of work. Table 4-28 summarizes the encroachments and added impervious area for each alternative.

TABLE 4-28
Floodplain and Added Impervious Area Impact Summary

	No-Action	IL 53 Freeway/Tollway	IL 83/US 45 with US 12
FIS Encroachments (Amount and Area)	38 encroachments 6.9 ha (17.0 ac)	10 encroachments 13.0 ha (32.1 ac)	33 encroachments 5.9 ha (14.6 ac)
Potential Longitudinal Encroachments	9	0	12
Added Impervious Area	135 ha (333 ac)	182 ha (449 ac)	163 ha (403 ac)
Compensatory Storage	8.3 ha (20.5 ac)	15.6 ha (38.5 ac)	7.1 ha (17.5 ac)
Detention Storage	14.3 ha (35.3 ac)	18.7 ha (46.3 ac)	17.1 ha (42.3 ac)

4.3.5 Biological Resources

The project alternatives generally would displace vegetation and wildlife habitat in the rights-of-way of the improvements. The paved area of the rights-of-way would completely displace existing habitat; however, the cover type outside the edge of pavement to the right-of-way line would be converted to grassy medians and grass with intermittent landscape plantings of trees and shrubs. The new grassy areas can be planted with native prairie vegetation, which reduces maintenance costs and provides a more natural cover type than turf grasses. The direct habitat conversion of cover type and habitat would cause some loss of wildlife habitat that serves as cover for breeding, foraging, and resting. For new roadway alignments, there would be some habitat fragmentation, and disruption of corridors for wildlife movement.

In general, most of the native cover types in the study area already are substantially altered, and wildlife is limited primarily to species that have successfully adapted to urban, suburban, or agricultural development. Overall, the project-related impacts to native cover types and wildlife resources would be minimal. Impacts to wildlife within the project-area could involve small population reductions of species associated with existing and available habitat. Many of the improvements would upgrade existing roadways (i.e., the No-Action Alternative (Baseline) and IL 83/US 45 with US 12 Alternative) and would have a minimal effect upon wildlife species that have already adapted to roadway edges. In some cases, however, species that rely upon higher quality habitat such as wetlands, natural areas, or large wood lots would be affected. Such species are discussed below.

4.3.5.1 No-Action Alternative (Baseline)

Natural habitat bordering the No-Action improvements have limited potential because of extensive development and periodic maintenance (Figure 4-19). Roadway improvements in this area would have minimal impact on the limited wildlife resources in the area.

Vegetation and Cover Types. Most of the proposed improvements involved with this alternative are associated with existing roadways. As a result, most of the cover type conversions and the fragmentation of large forested tracts would be minimal. Most cover types affected by this alternative are urban grasslands, closed canopy deciduous forest, row crops, and open canopy deciduous forest. The greatest potential impact would be related to the proposed Pulaski Road extension, which would bisect the Oak Grove Botanical Area Illinois Natural Area Inventory Site. This would introduce roadway edges to a large contiguous habitat area, potentially limiting north-south wildlife movement in this natural area, decreasing wildlife populations intolerant of roadway edges, and increasing the potential number of collisions between wildlife and vehicles. Although the endangered prairie white fringed orchid has been observed in the Oak Grove site, based on information provided by IDNR, the proposed Pulaski Road extension may not be located near specific known populations of that species. Before construction, the agency sponsoring the project would conduct detailed surveys to determine the potential for affecting that plant species.

Wildlife. Birds and most mammals are mobile; therefore the direct loss of habitat from this alternative would not be as critical as it would be to other species. Typically, these species would seek out other areas to forage, breed, and rest. Their mobility, however, exposes them collisions with vehicles as they attempt to cross roadways that have been widened, or by the addition of new roadways to areas not previously served. Losses to actual species groups should be minimal. Most reptiles and amphibians that occur in Lake County are less mobile, and so they upon the immediate habitat where they live. Additionally, species that depend upon wetland habitat could, to some extent, be affected by the No-Action Alternative (Baseline). This alternative would affect 27 ha (65 ac) of wetlands, many adjacent to existing roadways. Species that occur in these locations generally are adapted or are more tolerant to the existing conditions.

It is expected that the overall effect to these species would be minimal.

Forest preserves, nature preserves, INAI sites, and other large tract forested areas provide important protected habitat. Any impact to these resources are considered important from a wildlife standpoint. Critical areas of impact exist along Rollins Road, IL 21, IL 22, Pulaski Road, and US 45.

4.3.5.2 IL 53 Freeway/Tollway Alternative

The IL 53 Freeway/Tollway Alternative would be located mostly on new alignment. This alternative avoids most of the county's critical habitat areas located in forest preserves, nature preserves, INAI sites, and large forested tracts (Figure 4-20).

Vegetation and Cover Types. Most of the cover type impacts would occur to row crops, urban grasslands, and closed and open canopy deciduous forests. The IL 53 Freeway/Tollway Alternative would affect 15 wooded areas greater than 4 ha (10 ac). Six wooded areas could experience fringe impacts, five could lose trees from their edges, and four could suffer fragmentation of overall habitat. The greatest impacts to deciduous forests would occur south of Long Grove Road at Hicks Road, near the crossing of IL 22, Indian Creek Road, and south of IL 176. The improvements to IL 120 would further affect forested areas east of Grayslake and US 45 near Almond Marsh (Figure 4-20). Fragmentation of these areas could adversely affect wildlife populations that require large undisturbed wooded tracts and favor species that are more adaptive to edge environments. Competition for reduced habitat in these locations could likely cause some reduction in population for some birds and mammals.

Wildlife. The IL 53 Freeway/Tollway Alternative would be an access-controlled facility with a wide cross section, representing a potential barrier for both north-south and east-west wildlife movements. North-south movement is already limited by IL 120 (the east-west segment of this alternative). The east-west improvement planned for this alternative would impose additional barrier effects with access control fencing, median barriers, etc.

This alternative would not affect any major greenways or stream complexes in the county. The proposed east-west segment would cross the Des Plaines River and its natural greenway at the current IL 120 crossing, thereby minimizing the effects of a new crossing. As streams provide natural greenways and corridors for wildlife movement, the bridging of these features provides some limited corridors of accessibility for wildlife. Although there would be some avenues of access for reptiles, amphibians, and mammals, there would be limited impacts due to habitat fragmentation, isolation, and increased vehicle/wildlife collisions. There would be some loss of bird nesting and foraging areas due to the conversion of the undeveloped land within the proposed right-of-way to highway uses.

The proposed IL 53 Freeway/Tollway Alternative would directly affect the habitat and wildlife populations in the area reserved as right-of-way for the IL 53 Freeway/Tollway Alternative. The protected corridor has become a haven for wildlife escaping the continual development of their habitat in areas near the proposed roadway. The conversion of this protected corridor to highway would force wildlife that use the area to move to other locations. This could cause the protected open space near this alternative, consisting of forest preserves, nature preserves, natural areas, and wetland complexes, to experience increases in wildlife densities as well as some overall reduction in wildlife population.

4.3.5.3 IL 83/US 45 with US 12 Alternative

Similar to the No-Action Alternative (Baseline), the IL 83/US 45 with US 12 Alternative would improve mostly existing roadways; therefore, impacts to birds, mammals, reptiles, and amphibians would be minimal (Figure 4-21).

Vegetation and Cover Types. Most cover type impacts would occur to urban grasslands, row crops, closed canopy deciduous forests, rural

grasslands, and open canopy deciduous forests. The impact to large woodlots is comparable to that for the IL 53 Freeway/Tollway Alternative (Figure 4-20). The IL 83/US 45 with US 12 Alternative would affect 13 wooded areas over 4 ha (10 ac) in size. Of the 13 wooded areas, 10 could experience fringe impacts, 2 could affect existing edges, and 1 could have fragmentation of habitat. Fragmentation of wooded habitat is not considered significant for this alternative. As stated, most impacts to woodlots for this alternative would affect existing edges. Only one large deciduous tract along the bypass section west of Mundelein could experience fragmentation.

Wildlife. Since much of this alignment consists of improvements to existing roadways, species living adjacent to those roadways generally are tolerant of this condition. Roadway widening could increase the chances for vehicle collisions with wildlife and increase the barrier effect for less mobile terrestrial species such as reptiles and amphibians. The potential for increased roadkill for this and the other alternatives is not expected to degrade the populations of wildlife species occurring in the area. This alternative consists primarily of roadway improvements and is therefore less likely to fragment and isolate habitat. The Mundelein bypass would be on new alignment and would use part of the IL 53 Freeway/Tollway alignment. There is the potential for limited fragmentation and isolation along this short segment of new roadway.

This alternative would have a little effect on forest preserves, natural areas, and nature preserve resources (less than 2 ha or 5 ac); therefore, no major impacts are anticipated for these important habitat resource areas. There would be no additional crossings of the greenway along the Des Plaines River from this alternative. Improvements are proposed for three roadways that cross the Des Plaines River and the greenway. These improvements are along Interstate 94, IL 60, and IL 137. These proposed improvements would have little additional impact to area wildlife because I-94 is an access-controlled highway, and IL 60 and IL 137 are 4-lane highways.

This alternative would affect the least amount of wetlands compared to other alternatives, reducing potential impacts to wildlife that use wetlands for forage and cover.

4.3.5.4 Summary of Biological Resource Impacts

Both build alternatives avoid major impacts to the most important wildlife habitat in the study area (forest preserves, nature preserves, and natural areas). Generally, the No-Action Alternative (Baseline) would have minimal impact to biological resources, except for an impact to the Oak Grove Botanical Area with the construction of the Pulaski Road extension.

The IL 83/US 45 with US 12 Alternative would have a slightly less impact than the No-Action and the IL 53 Freeway/Tollway alternatives. The IL 83/US 45 with US 12 Alternative affects areas already disrupted by urban development, including roadways. Therefore, improvements to roadways could have limited effect on wildlife resources, compared to new roads on new alignments. Impacts are comparable for the two build alternatives in areas that share common alignments (e.g. the Mundelein bypass).

The IL 53 Freeway/Tollway Alternative could have slightly greater impacts, particularly in the north-south direction. The right-of-way for much of this alternative has been reserved for many years and over time has developed into a corridor for wildlife in a developing area. This alternative would replace the habitat provided by the protected corridor causing displacement of wildlife populations, along with the potential for habitat fragmentation and isolation. The species in this area generally are tolerant of development and would be expected to compete well in other locations if forced to relocate. However, increased wildlife density and competition for available habitat in neighboring areas could cause a small reduction in the overall population.

4.3.6 Threatened and Endangered Species

According to information supplied by the Illinois Department of Natural Resources (IDNR 2000), the project alternatives are near several recorded occurrences of threatened or endangered species. The accuracy of available data, however, does not allow a determination of specific impact to these resources. When a preferred alternative is chosen, additional studies would be conducted to determine potential presence and impacts to threatened and endangered species. These could include floristic, avian, mammalian, herpetological, fish, insect, mollusk, and other surveys.

Generally, bird species represent most of the listed species identified for the study area (IDNR 2000). No threatened or endangered mammal species have been identified in the area. To some degree, each project alternative would reduce potential foraging areas; however, there is abundant habitat in the area to sustain these populations. The specific habitat impacts for each alternative are discussed below.

4.3.6.1 No-Action Alternative (Baseline)

Federal-Listed Species. Improvements under the No-Action Alternative (Baseline) for the Pulaski Road extension could affect the Oak Grove Botanical Area INAI site, which harbors the eastern prairie fringed orchid (*Platanthera leucophaea*, a federal and state threatened plant species). The eastern prairie fringed orchid is scattered throughout the site, and isolating the species in the north remnant of the site may affect its continued existence. Based on the general locations shown by IDNR (2000), it appears that actual roadway alignment would not directly affect the species. Studies conducted near IL 22 also indicated the presence of eastern prairie fringed orchid (Taft 1997b) in several locations. The best available information shows that known sites would not be affected; however, detailed surveys would be required to confirm the presence or absence of the species within the Pulaski Road and IL 22 project rights-of–way.

State-Listed Species. Based on correspondence from IDNR (2000), several state-listed species occur in the area of No-Action Alternative (Baseline) improvements. They are the pied-billed grebe (*Podilymbus podiceps;* state threatened), yellow-headed blackbird (*Xanthocephalus xanthocephalus;* state endangered), queen-of-the-prairie (*Filipendula rubra;* state endangered), pretty sedge (*Carex woodii*; state threatened), and seaside crowfoot (*Ranunculus cymbalaria;* state endangered).

Avian studies by INHS along IL 22 from US 41 to IL 83 (FAP 337) revealed marginal suitable habitat for the pied billed grebe (*Podilymbus podiceps*; state threatened). In this study, no state-listed species were observed nor was direct evidence of breeding observed. It was determined that there is suitable habitat for five state-listed bird species near the alternative, but there was no evidence of their breeding. These birds are the American bittern (*Botaurus lentiginosus;* state endangered), least bittern (*Ixobrychus exilis;* state endangered), Bewick's wren (*Thryomanes bewickii;* state endangered), loggerhead shrike (*Lanius ludovicianus;* state threatened) and Henslow's sparrow *(Ammodramus henslowii;* state endangered). One bird species, the sharp-shinned hawk (*Accipiter striatus*) for which there is marginal suitable habitat within the study area (Amundsen and Enstrom 1996), is no longer a state-listed species. Proposed improvements to this roadway may affect suitable foraging areas, but it was determined that there is no suitable breeding area for these birds within the project limits. Therefore there would be no impacts to these species (IDOT 2000b).

Avian studies by the INHS (Amundsen and Enstrom 1996) recorded an observance of the American bittern along IL 22 between US 14 to Quentin Road (FAP 341). Breeding habitat for three other species of birds was assessed within the vicinity of this section of IL 22. These included the sandhill crane (*Grus canadensis;* state threatened), red-shouldered hawk (*Buteo lineatus;* state threatened), and great egret (*Ardea alba;* formerly state threatened). Amundsen and Enstrom (1996)

observed great egrets foraging within the study area, although they were not observed to be breeding. The red-shouldered hawk was observed north of IL 22 in 1994 between Kelsey Road and US 14, though direct evidence of breeding was not observed. The proposed improvements to this roadway would not affect breeding but may minimally affect marginal foraging areas for these bird species.

The seaside crowfoot (*Ranunculus cymbalaria;* state endangered) was identified near the former Deerfield Road Toll Plaza (ISTHA 1997). Fifty-five delineated colonies were observed in roadside ditches between Deerfield Road and Duffy Lane on both sides of the Tollway. The ISTHA developed a mitigation plan as compensation for potential impacts to these plant populations to meet the requirements of the IDNR.

Fish surveys conducted by the INHS have confirmed the presence of the Iowa darter (*Etheostoma exile;* state endangered) in several stream crossings along IL 21 near IL 120. These stream reaches would be affected by the No-Action Alternative (Baseline). Commitments to minimize and mitigate for potential impacts are:

- Use of bottomless box culverts to avoid disturbing streambeds.
- Locating bridge abutments outside the bank/shoreline to avoid streambed disturbance.
- No in-stream work to occur during spawning of Iowa darter (April to May).
- No earthwork or land-clearing near water bodies harboring this species during spawning.
- Rigorous enforcement of erosion control measures near the tributary harboring this species.
- Limiting earthwork and vegetation removal to the area of proposed improvements.
- Coordinating final plans with the IDNR prior to construction commencing for final clearance of threatened and endangered species issues.

Nature Preserves and INAI Sites. The No-Action Alternative (Baseline) would not impact designated nature preserves (CH2M HILL, GIS Database 1999). This alternative, however, could potentially affect three designated INAI sites totaling 1.25 ha (3.1 ac; Table 4-29). The greatest impact to INAI sites would occur at the Oak Grove Botanical Area INAI Site. Improvements in this area would isolate a small portion of the designated site, leaving a small remnant north of the new Pulaski Road extension.

4.3.6.2 IL 53 Freeway/Tollway Alternative

Federal-Listed Species. Based on information provided by the USFWS (February 2001), there are two locations of federally endangered prairie white fringed orchid near this alternative. This plant has been identified east of the proposed interchange with Illinois Route 22. Based on the proposed alignment, there will be no direct impacts to this plant. USFWS has also indicated the presence of this plant species near the interchange of IL 120 with I-94. The exact location of the plant relative to the existing and proposed roadway has not been provided, therefore, potential impacts to this plant cannot be ascertained. Detailed botanical surveys will be conducted in this area if this alternative is selected.

State-Listed Species. Based on a database search by IDNR (2000), several state-listed species are known to occur near the IL 53 Freeway/Tollway Alternative. State-listed bird

TABLE 4-29
INAI Sites Affected under No-Action Alternative (Baseline)

INAI Site	Roadway Improvement	Potential Impact	Total INAI Site Size
Oak Grove Botanical Area	Pulaski Road	1.1 ha (2.7 ac)	21.0 ha (52 ac)
Buffalo Grove Prairie	Lake-Cook Road	0.1 ha (0.1 ac)	3.8 ha (9.3 ac)
Almond Marsh	US 45	0.1 ha (0.3 ac)	98.0 ha (242.3 ac)

species include the yellow-headed blackbird (state endangered), sandhill crane (state threatened), pied-billed grebe (state threatened), least bittern (state threatened), and heron rookery (treated here as a protected element occurrence). There is the potential to impact foraging areas for these birds. One state-listed plant species, Crawford's sedge (*Carex crawfordii;* state endangered) is known to occur near the IL 53 Freeway/Tollway Alternative. Based on IDNR (2000), two other state-listed bird species are known to occur within 1.6 km (1 mi) of the IL 53 Freeway/Tollway Alternative; the common moorhen (*Gallinula chloropus;* state threatened) and the black tern (*Chlidonias niger;* state endangered). Direct impacts to these species are not anticipated, but they could move their nesting areas over time. No direct impacts are expected to these bird or plant species from the IL 53 Freeway/Tollway Alternative.

Approximate element occurrence locations and correspondence provided by IDNR (2000) show several listed species to be in or near wetlands identified within the IL 53 Freeway/Tollway Alternative. Based on IDNR, Table 4-30 summarizes selected wetlands identified in the IL 53 Freeway/Tollway Alternative and the listed species (including a Heron rookery) that have been observed in them.

One species of fish, the Iowa darter (*Etheostoma exile;* state endangered), was identified within a tributary of the Des Plaines River in the IL 120/IL 21 interchange. The IDOT has taken into consideration protective actions for this fish species as part of proposed improvements to IL 21 under the No-Action Alternative (Baseline). Commitments similar to those made for the proposed IL 21 improvements would be implemented if this alternative is selected. No other known locations of the Iowa darter would be directly affected by this alternative.

Though Blanding's turtle (*Emydoidea blandingii*; state threatened) is known to occur within 1.6 km (1 mi) of the IL 53 Freeway/Tollway Alternative (IDNR 2000) no impact to this species is expected from proposed roadway improvements. It is possible that several wetlands within the study area may be suitable habitat for this species (Phillips 1995).

Nature Preserves and INAI Sites. There are five designated Illinois nature preserves or INAI sites within 1.6 km (1 mi) of the IL 53 Freeway/Tollway Alternative. None of these sites would be directly or indirectly affected by this alternative.

4.3.6.3 IL 83/US 45 with US 12 Alternative

Based on information provided by IDNR (2000) and the USFWS (2001), several state-listed species and one federally-listed species are known to occur in the vicinity of the proposed IL 83/US 45 with US 12 Alternative.

TABLE 4-30
Selected Wetlands Identified in the IL 53 Freeway/Tollway Alternative and Listed Species Observed in Them

Element Occurrence	Adjacent to or in Wetland #
Yellow-headed blackbird	120-23, 120-5
Crawford's sedge	120-23
Sandhill crane	120-5
Pied-billed grebe	120-5, 53-43
Least bittern	120-5
Iowa darter	120-342g
Oak Grove Botanical Area (INAI)	94-12
±4 threatened and endangered species	120-6
Heron rookery	53-43

Federal-listed Species. Based on correspondence provided from USFWS (2001), the federally-listed plant species, the eastern prairie fringed orchid (*Platanthera leucophaea* - Federally threatened, state endangered), is known to occur at several locations along the IL 83/US 45 with US 12 Alternative.

IDNR (2000) has provided additional information on the potential location of this orchid species. Proposed improvements to Interstate 94 in the vicinity of the Oak Grove Botanical Area INAI site would partially impact wetlands numbered 94-11, 94-13, and 137-3. The eastern prairie fringed orchid is known to occur in close proximity to these wetlands, though not within the right-of-way of the proposed road way improvements. The proposed improvements to Interstate 94 would be within the existing right-of-way, therefore no direct impacts to this species are anticipated.

USFWS has identified areas along the east side of Interstate 94, north and south of the Oak Grove Botanical Area INAI site that harbor the prairie white fringed orchid. Proposed improvements to Interstate 94 in this location will be within the existing right-of-way. Therefore no direct impacts to this plant species is anticipated at these locations.

USFWS identified one other location, south of IL 22 along IL 83 as harboring the prairie white fringed orchid. The exact location of the plant relative to the proposed improvements has not been provided. Therefore potential impacts to this plant at this location cannot be ascertained. Detailed botanical surveys will be conducted in this area if this alternative is selected.

State-Listed Species. Based on correspondence by IDNR (2000), several state-listed species are known to occur in close proximity to improvements associated with the IL 83/US 45 with US 12 Alternative. Table 4-31 summarizes listed species known to occur in or adjacent to wetlands identified within the IL 83/US 45 with US 12 Alternative.

Six species of birds were identified within 1.6 km (1 mi) of the proposed improvements (IDNR 2000): yellow-headed blackbird (state endangered), pied-billed grebe (state threatened), least bittern (state threatened), sandhill crane (state threatened), and red-shouldered hawk (state threatened); and eight species of plants: mountain blue-eyed grass (*Sisyrinchium montanum;* state endangered), pretty sedge (*Carex woodii;* state endangered), Crawford's sedge (*Carex crawfordii;* state threatened), and marsh speedwell (*Veronica scutellata*; state threatened). Other plant species were identified for the nature preserves and INAI sites within 1.6 km (1 mi) of this alternative, including dog violet (*Viola conspersa*, state threatened), heart-leaved plantain (*Plantago cordata;* state endangered), ill-scented trillium (*Trillium erectum*; state endangered), purple-fringed orchid (*Platanthera psycodes;* state endangered), and the northern cranebill (*Geranium bicknelli;* state endangered). No direct impacts are expected to these bird or plant species from the IL 83/US 45 with US 12 Alternative.

Due to similarities in the alignments for the IL 83/US 45 with US 12 Alternative and the IL 53 Freeway/Tollway Alternative along 120 near the Almond Marsh site, potential

TABLE 4-31
Selected Wetlands Identified in the IL 83/US 45 with US 12 Alternative and Listed Species Observed in Them

Element Occurrence	Adjacent to Wetland #
Sandhill crane	53-8, 53-7
Iowa darter	21-19
Oak Grove Botanical Area (INAI)	94-12
Eastern prairie fringed orchid	137-3, 94-11, 94-13
Mountain blue-eyed grass	12-4
±7 threatened and endangered species	60-9, 60-4, STM-26, STM-27, STM-28, 21-1

impacts to listed species at this site would be similar for both alternatives. This includes potential proximity impacts to the yellow-headed blackbird (state endangered) and the pied-billed grebe (state threatened).

One species of fish, the Iowa darter (state endangered), was identified within 1.6 km (1 mi) of the proposed improvement project by IDNR at three separate locations. This fish was identified near the southeast quadrant of the interchange of Interstate 94 and IL 176. The fish was also found near IL 21 at two locations. As mentioned previously, this fish was observed near the interchange area of IL 21 and IL 120. This fish is also been identified in a tributary to the Des Plaines River, east of IL 21 within Independence Grove Forest Preserve site, between IL 120 and IL 137. No direct impacts are anticipated for this species, but as noted in Section 4.3.2, this alternative could affect the water quality in streams supporting it. Programmed improvements for IL 21 near IL 120 considered protective actions for the Iowa darter during proposed construction to avoid or minimize potential impacts.

There are no known occurrences of the Blanding's turtle within the proposed IL 83/US 45 with US 12 Alternative. It is possible that several wetlands within the study area may be suitable habitat for this species (Phillips 1995).

Nature Preserves and INAI Sites. There would be no direct impact of nature preserves from this alternative, but there would be impacts to three individual INAI sites (Table 4-32. Total potential impact to INAI sites from this alternative is 0.06 ha (0.15 ac), most of which is to the River Road Woods site.

4.3.6.4 Operational Impacts to Designated Nature Preserves and INAI Sites

During roadway operation, there are potential impacts to water quality and vegetation due to pollutants and toxicants from vehicles or deicing chemicals entering wetlands. Highway operations can also potentially influence vegetation communities by changing water volumes reaching the wetlands. Highway runoff drainage systems may direct additional water into wetland systems or water bodies that may be relied upon by the sensitive communities located within the designated sites. Potential changes to the groundwater regime may also occur.

Sodium chloride (salt) applied to roads for ice control is considered to be the primary long-term water quality issue, as it could affect the growth and health of vegetation by direct runoff, splash, and aerosol spray. Studies indicate that 60 to 80 percent of salt runs off into surface water or wetlands, 15 to 30 percent occurs as splash, and up to 3 percent occurs as spray (Frost et al. 1981; Diment et al. 1973; Lipka and Aulenbach 1976; Sucoff 1975). Depending upon the community's proximity to the highway system, the proposed drainage systems, and soil conditions, these three mechanisms would vary in importance. The quality of stormwater runoff that may drain into these communities is affected by traffic volumes, maintenance procedures, drainage methods, and deicing procedures that affect the chloride levels monitored in runoff.

The No-Action Alternative (Baseline) includes a large inventory of improvements to existing roadways, and therefore includes sodium chloride

TABLE 4-32
Affected INAI Sites under IL 83/US 45 with US 12 Alternative

INAI Site	Impacting Roadway Improvement	Approximate ha (ac)	Total INAI Site Size ha (ac)
Oak Grove	I-94	< 0.004	21.0 (52)
River Road Woods	IL 137	0.06 (0.15)	6.9 (17)
MacArthur Woods	IL 137 and St. Mary's Road	< 0.004	157.4 (389)
Almond Marsh	IL 120		98.0 (242.3)

dispersion from deicing materials. The area of most concern is the Oak Grove Botanical Area, which would be subject to additional sodium chloride dispersion from the proposed extension of Pulaski Road. The new roadway would bisect the northern half of the site and would increase the area subject to sodium chloride. Two other INAI sites affected by the project that would be subject to additional sodium chloride dispersion include the Buffalo Grove Prairie and the Almond Marsh.

The IL 83/US 45 with US 12 Alternative includes numerous existing roadway improvements and therefore includes dispersion of sodium chloride from deicing materials. There would be some additional impacts from sodium chloride from added improvements along these routes. The areas of most concern are MacArthur Woods Nature Preserve, River Road Woods INAI Site, Ascension Sedge Meadow INAI Site, Oak Grove Botanical Area INAI site, parts of the Almond Marsh Nature Forest Preserve, parts of the Edward Ryerson Nature Preserve, Long Grove INAI site, Reed-Turner Nature Preserve, and parts of the Round Lake Marsh INAI site.

The IL 53 Freeway/Tollway Alternative would introduce sodium chloride dispersion to areas that currently receive little or no splash or spray. The Almond Marsh Forest Preserve and ADID high quality wetlands adjacent to the alignment would be the most important resources potentially affected by sodium chloride under this alternative.

4.3.6.5 Summary of Impacts to Threatened and Endangered Species

Two alternatives (No-Action and IL 83/US 45 with US 12) would affect three INAI sites. The most substantive impact would occur under the No-Action Alternative (Baseline), which would involve the Oak Grove Botanical Area (INAI site), with one federal-listed plant species. The IL 53 Freeway/Tollway Alternative would not affect any INAI sites.

Both the IL 53 Freeway/Tollway Alternative and the IL 83/US 45 with US 12 Alternative could affect one state-listed fish species (Iowa darter). Mitigation strategies for protecting the species are discussed in Section 4.3.6.1, *No-Action Alternative (Baseline) State-listed Species*. Based on correspondence with IDNR (2000) and USFWS (2001), the project alternatives would have no other direct impact on threatened and endangered species.

Future work associated with the preferred alternative would include detailed threatened and endangered species field surveys to determine presence or absence, and the required consultation with the IDNR and the U.S. Fish and Wildlife Service.

4.4 Air Quality

Chicago Area Transportation Study is responsible for analyzing regional air quality conformity. The endorsed 2020 RTP includes an extension of IL 53 in Lake County as part of the plan. The 2020 RTP calls out specific freeway/expressway and other major facility improvements; however, it includes only placeholder values for arterial improvements. Neither build alternative is included in the TIP for fiscal years 2001–2006. The 2020 RTP and the TIP were found to conform by the FHWA and the Federal Transit Administration (FTA) on November 2, 2000. These findings were in accordance with the USEPA regulations entitled *Criteria and Procedure for Determining Conformity to State or Federal Implementation Plans of Transportation Plans, Programs, and Projects Funded or Approved Under Title 23 USC or the Federal Transit Act* (40 C.F.R. Part 93). Future air quality analysis would require the recommended alternative to be assessed, as part of a package of regional improvements, for air quality conformity with the appropriate future TIP.

In addition to the SIP requirements, metropolitan planning organizations (MPO) are required to undertake conformity determinations on metropolitan transportation plans and transportation improvement programs before they are adopted, approved, or accepted. Section 176(c)(4) of the Clean

Air Amendments of 1990 requires that transportation plans, programs, and projects which are funded or approved under Title 23 U.S.C. must be determined to conform to state or federal air implementation plans. Conformity to an implementation plan is defined in the Clean Air Act as conformity to an implementation plan's purpose of eliminating or reducing the severity and number of violations of the NAAQS and achieving expeditious attainment of such standards. The implementing regulations for determining conformity of transportation projects are found in 40 C.F.R. Part 93, *Criteria and Procedures for Determining Conformity to State or Federal Implementation Plans of Transportation Plans, Programs, and Projects Funded or Approved under Title 23 U.S.C. or the Federal Transit Act.* Highway or transit projects which are funded or approved by the FHWA or the FTA must also be included in a conforming plan before they are approved or funded by the DOT or an MPO.

In addition to the conformity analysis, a micro-scale carbon monoxide air quality analysis was also performed for the project alternatives. This analysis employed the use of the Illinois Carbon Monoxide Screen for Intersection Modeling (COSIM).[8] The detailed analysis of local carbon monoxide levels focused on potential violations or excursions of the 8-hour carbon monoxide standard. Experience has shown that the 8-hour carbon monoxide standard is more critical than the 1-hour carbon monoxide standard. The analysis results were based on several assumed conditions, including 2020 traffic conditions at the "worst case" intersections for each project alternative. The selection of the "worst case" locations was guided by intersections with the highest peak traffic volumes and nearby receptors sensitive to air quality (schools, homes, nursing homes, etc).

4.4.1 No-Action Alternative (Baseline)

The COSIM analysis evaluated the worst case location for the No-Action Alternative (Baseline) (Table 4-33). At this location, the 8-hour carbon monoxide level was estimated to be below the NAAQS of 9.0 parts per million (ppm).

4.4.2 IL 53 Freeway/Tollway Alternative

The intersection of IL 53 and Lake-Cook Road, representing the worst case condition, was evaluated for the IL 53 Freeway/Tollway Alternative. The 8-hour carbon monoxide concentration for a sensitive receptor near this intersection was 6.6 ppm during the peak travel period in 2020 (Table 4-33).

TABLE 4-33
Carbon Monoxide Screening Analysis at "Worst Case" Locations

Alternative	8-hour Carbon Monoxide (ppm)
No-Action	
Washington /O'Plaine Road	8.7
IL 53 Freeway/Tollway	
IL 53/Lake-Cook Road	6.6
IL 83/US 45 with US 12	
US 12/Lake-Cook Road	6.4

[8] A modeling program used to calculate the carbon monoxide concentrations, based on intersection geometry, user inputs, and worst-case assumptions.

The tollway option for this alternative could produce air quality conditions at toll plaza locations; therefore, an air quality analysis for a plaza location was also conducted. This analysis required a detailed evaluation using USEPA's air quality modeling software consisting of CAL3QHC and Mobile 5a. The potential air quality effects of a toll plaza for 2000 were evaluated assuming that the plaza would be equipped with manual lanes only, and stopped traffic at all lanes of the plaza. The plaza arrangement was configured to reflect a "worst case" scenario for this analysis. The carbon monoxide concentration estimated for the plaza condition would be 4.0 ppm for the 8-hour carbon monoxide standard. This level is well below the NAAQS of 9.0 ppm.

4.4.3 IL 83/US 45 with US 12 Alternative

The air quality analysis for the IL 83/US 45 with US 12 Alternative was conducted for the intersection of US 12 and Lake-Cook Road. The COSIM screening results show that carbon monoxide would not be exceeded for the NAAQS standard at either location (Table 4-33).

4.4.4 Summary of Air Quality Impacts

Overall, the results of the air quality analysis show that all of the project alternatives would be below the 8-hour NAAQS for carbon monoxide of 9.0 ppm.

4.5 Noise

The potential effects of the traffic noise from the project alternatives are described below. The analysis was guided by the FHWA policies and procedures, 23 C.F.R. 772, the IDOT Noise Analysis Policy dated April 3, 2000, and the ISTHA Traffic Noise Study and Abatement Policy. However, for this type of study, an exhaustive analysis would be premature without additional detailed engineering of the proposed improvements. This assessment is intended to provide a relative measure of the potential affects of the alternatives under consideration. A detailed noise assessment would occur during future phases of work for the preferred alternative.

The noise assessment was guided by an objective to determine the relative degree of potential noise impact across the range of project alternatives. To quantify the objective, the number of residential structures that have identified exterior activity that could be affected by noise (experience traffic noise levels that approach or exceed the FHWA Noise Abatement Criteria (i.e., 67 dBA)) were quantified.

The IDOT policy defines noise impacts occurring when design-year traffic noise levels approach or exceed the NAC, with approach defined as 66 dBA for the residential NAC of 67 dBA, or when design-year traffic noise levels are at a substantial increase over existing traffic generated noise levels, defined as an increase greater than 14 dBA.

The ISTHA policy states that once a site has been studied, traffic noise abatement should be considered if the exterior traffic generated noise levels at the site are at or above 67 dBA L_{eq}(h), and that the proposed abatement at the site will achieve a minimum 5 dBA reduction in traffic generated noise levels. Reasonable efforts shall be made to achieve reductions of 8 dBA.

The approach for this analysis required that noise impact zones be defined for the improvements in each alternative (i.e., the distance from the edge of roadway that the NAC would be approached or exceeded). The noise impact zones were determined with the use of the Traffic Noise Model (TNM).[9] The modeling step defined typical traffic noise levels for various roadway types represented in the project alternatives. Based on the defined roadway conditions (i.e., future 2020 traffic volume, traffic mix, and traffic speed, at ground elevation), the TNM look-up tables were used to determine the typical noise levels at various distances from the representative roadways.

[9] TNM is the approved noise model for conducting highway noise analysis by the Federal Highway Administration.

Based on these typical noise level calculations, the NAC is approached or exceeded at a distance within 18 m (60 ft) for local/collector roads, within 36 m (120 ft) for arterial roads, and within 98 m (320 ft) for freeways/tollways from the edge of pavement. These noise impact zones were applied to the improvements for the project alternatives to determine the potential number of residential areas with exterior activity that could be affected by noise levels greater than 66 dBA. Other sensitive receptors, such as hospitals, schools, churches, and special land uses, may occur in the noise impact zones, however, were not specifically identified. The noise effects for the alternatives described below do not include the use of noise abatement measures. It should be assumed that the use of such measures, which will be examined and evaluated for the preferred alternative, will substantially reduce the number of affected residential areas with exterior activity. For this analysis, it is not practical to develop a detailed noise abatement strategy for such an extensive study area. This analysis does, however, indicate the comparative scale of anticipated traffic noise impacts among the project alternatives.

4.5.1 Noise Impacts

4.5.1.1 No-Action Alternative (Baseline)

In residential areas along the No-Action Alternative (Baseline), 1,211 properties have identified exterior activities that could be affected by noise levels approaching or exceeding the NAC (Table 4-34, on the following page). More than 1,100 of the structures would be associated with arterial improvements, whereas 100 of the structures would be affected by improvements along I-94. The number of potentially affected properties includes both single family and multi-family structures and is based on existing development. The largest concentrations of affected properties are along IL 22, IL 60, Buffalo Grove Road, Butterfield Road, and Washington Street. Development may increase along any of these routes, so the numbers are subject to change.

4.5.1.2 IL 53 Freeway/Tollway Alternative

In residential areas along the IL 53 Freeway/Tollway Alternative, 417 properties would be affected with noise levels approaching or exceeding the NAC (Table 4-35, on page 4-53). The largest concentration of affected residential areas would be located along the north-south alignment in the vicinity of Hawley Street and IL 176. The number of potentially affected residential areas includes both single-family and multi-family residences. Similar to other alternatives, an increase in development is a possibility along any of these routes; therefore, this number may be subject to change in the future.

4.5.1.3 IL 83/US 45 with US 12 Alternative

In residential areas along the IL 83/US 45 with US 12 Alternative, approximately 273 properties would be affected with noise levels approaching or exceeding the NAC (Table 4-36, on page 4-53). About 50 percent of the potentially affected residential areas are located on IL 83, IL 21, and US 12. These residential areas include both single-family and multi-family residences. An increase in development is a possibility along any of these routes; therefore, this number is subject to change.

4.5.2 Abatement

This section outlines general noise abatement practices applied to roadway projects. A more detailed analysis, based on the alternative selected, would be conducted to determine the appropriate abatement measures, their feasibility and reasonableness, and their locations during future phases of work.

A number of structural and nonstructural abatement measures are available and have been proven through use in a variety of situations to reduce the traffic noise impacts. Examples of noise abatement measure are described below and may serve as possible methods to reduce project related noise.

Noise walls are commonly applied in urban and suburban areas and are capable of achieving a 5 dBA noise level reduction or more when tall enough to break the line of sight from the noise source to the receiver. For a design goal of 8 dBA minimum reduction, barrier heights must be taller; in practice, barriers 3.7 to 5.5 m (12 to 18 ft) in height are generally common. The reasonableness of a barrier is determined by such factors as potential sound level reduction, cost, aesthetics of the area, views of affected residents, and additional environmental issues created.

Studies indicate that a change of 3 dBA is a barely perceivable change in the noise volume heard. A change of 5 dBA is readily perceived, and an increase/reduction of 10 dBA is perceived as being twice/half as loud.

Sound levels naturally attenuate due to distance. In other words, as the receiver of noise is moved away from the noise source, the noise level would decrease. Generally, sound from moving traffic noise sources will be reduced 3 to 5 dBA with each doubling of distance. For instance, if the traffic noise level is 60 dBA at 15 m (50 ft) from the roadway, it will be 55 to 57 dBA at 30 m (100 ft) [15 m × 2 {50 ft × 2}] from the roadway. The reduction is dependent upon the type of

TABLE 4-34
Residences Within Noise Impact Zones for the No-Action Alternative (Baseline)

Roadway	Residences within Noise Impacts Zone*
Bradley Road between IL 176 and Atkinson Avenue	0
Martin Luther King Drive between IL 41 and IL 131	38
Pulaski Road between IL 43 and O'Plaine Road	22
Sunset Avenue between Delaney Road and Greenbay Road	0
Rollins Road between IL 83 and US 45	7
IL 22 between US 14 and US 41	347
IL 21 between IL 137 and IL 120	11
Buffalo Grove Road between IL 22 and IL 83	95
Busch Road between IL 83 and Weiland Road	54
I-94 between Deerfield Road and IL 22	100
Weiland Road between Long Grove Road and Prairie Road	8
Lake-Cook Road between IL 83 and I-94	52
Butterfield Road between US 45 and Allanson Road; IL 176 and IL 137	105
IL 60 between Lake Road and IL 176	135
US 45 between IL 176 and Washington Street	50
Peterson Road between IL 60 and US 45	8
Hunt Club Road between Washington Street and IL 120	36
Midlothian Road at intersection with IL 60	0
Washington Street between Lake Street and I-94	143
Total	**1,211**

*Excludes residences that would be displaced by the improvement.

TABLE 4-35
Residences within the Noise Impact Zone for the IL 53 Freeway/Tollway Alternative

Roadway	Residences within Noise Impacts Zone
IL 83 at intersection with New IL 53	36
Midlothian Road at intersection with New IL 53	46
Indian Creek Drive at intersection with New IL 53	9
Gilmer Road at intersection with New IL 53	1
New IL 53 between Old McHenry Road and Cuba Road	23
New IL 53 to 1 mile north of Cuba Road	1
New IL 53 between IL 83 and Hawley Street	67
New IL 53 between Hawley Street and IL 176	33
New IL 53 between IL 176 and Winchester Road	68
Fish Lake Road between IL 60 and IL 120	2
New IL 120 between Bacon Road and Alleghany Road	2
New IL 120 between IL 21/IL 137 and US 45	17
US 45 at intersection with New IL 120	20
IL 120 between US 45 and Almond Road	35
IL 120 between Almond Road and Hunt Club Road	7
IL 120 between Hunt Club Road and Milwaukee Road/IL 21	34
IL 120 between O'Plaine Road and IL 43	16
Total	**417**

*Excludes residences that would be displaced by the improvements

TABLE 4-36
Residences within the Noise Impact Zone for the IL 83/US 45 with US 12 Alternative

Roadway	Residences within Noise Impact Zone*
IL 83 between IL 53 and IL 120	47
Midlothian Road between Gilmer Road and Hawley Street	9
IL 120 between IL 83 and Almond Road	29
Alleghany Road between IL 120 and Peterson Road	5
Long Grove Road/IL 53 between IL 53 and IL 83	20
Rockland Road/IL 176 at the proposed intersection of the bypass	12
IL 21 between Lake-Cook Road and IL 60	43
St. Mary's Road between IL 60 and IL 137	31
IL 137 between IL 21 and I-94	28
US 12 between IL 53 and IL 176	47
Hicks Road between Lake-Cook Road and Long Grove Road	2
Total	**273**

*Excludes the residences that would be displaced by the improvements

ground cover. Soft surfaces such as grass will attenuate noise more than harder surfaces such as pavement.

Certain conditions, including openings for side streets, driveways, and other accesses such as sidewalks, stream crossings, recreational trails, and the presence of industrial and commercial development, are not conducive to the use of traffic noise abatement barriers. Frequent breaks or openings in a traffic noise abatement structure created by the conditions described above substantially reduce and compromise the effectiveness, feasibility, and reasonableness of traffic noise abatement. These conditions are typical of the IL 83/US 45 with US 12 Alternative, which limits potential implementation of abatement measures.

Other measures to reduce traffic noise include traffic management measures, comprehensive land-use planning and zoning in developing areas, and shifting the roadway location (noise source) vertically and/or horizontally. Traffic management measures can also be applied to limit motor vehicle type, travel speed, traffic volume, and/or time of operation. These measures and practices are most common on local streets and access within and around residential, commercial, and industrial land uses, and are rarely applied to higher types of roadways. Changes to the roadways' horizontal and vertical alignments generally involve locating the roadway a sufficient distance from noise-sensitive areas. These shifts are normally optimized as standard practice to the extent feasible in the layout of a roadway design for the environs involved. This type of abatement is usually only considered and realistically available for a roadway being placed on a new alignment. In areas where the roadway would be below grade, noise levels would be lower and noise abatement may not be necessary. This type of abatement is generally considered with a roadway improvement on a new alignment, although for a new highway, noise abatement options are more flexible and can be incorporated in the planning process. The most efficient and overall effective traffic noise abatement is accomplished through integrated and comprehensive land use planning and zoning through local communities and municipal jurisdictions.

4.5.3 Summary of Noise Impacts

Noise impacts for the project alternatives vary widely. The No-Action Alternative (Baseline) with its many kilometers of arterial improvements would have the greatest noise impact on nearby residential structures (Table 4-37). Over 1,200 residential structures for this alternative would potentially exceed the NAC for residential properties. For the IL 53 Freeway/Tollway Alternative over 400 residences would be affected and for the IL 83/US 45 with US 12 Alternative over 270 residences would be affected. The noise impacts have been estimated without noise abatement measures, which would most likely be implemented at feasible locations for the preferred alternative to reduce the effects of traffic noise.

A number of structural and nonstructural abatement measures are available and have been proven through use in a variety of situations to reduce the traffic noise impacts, such as noise walls, traffic management measures, responsible comprehensive land-use planning and zoning in developing areas, and shifting the roadway location (noise source) vertically and/or horizontally. The uses of these measures, however, are affected by existing conditions such as closely spaced side streets or driveways along the route designated for

TABLE 4-37
Residential Noise Impact Summary

Alternative	Potential Residential Structures Affected
No-Action	1,211
IL 53 Freeway/Tollway	417
IL 83/US 45 with US 12	273

improvement. For these reasons, the feasibility for incorporating noise abatement measures along the improvements for IL 83/US 45 with US 12 Alternative is more difficult to accomplish. The IL 53 Freeway/Tollway Alternative, however, offers the potential for considerations of a number of abatement options (walls, depressed roadway sections, landscaping, etc.).

4.6 Cultural Resource Impacts

The potential effects of the project alternatives upon cultural resources are described in this section.[10] The potential environmental consequences related to the project alternatives were determined with the use of existing and available data and limited field reconnaissance. Overall, the assessment of cultural resource impacts is intended to provide a relative measure of the potential effects of the alternatives under consideration.

Numerous archaeological and structural resources are located throughout the county. For each alternative, however, only a small number of structures are likely to have the potential to be eligible for the NRHP. The State Historic Preservation Office (SHPO) has not rendered any opinion regarding the potential eligibility of the structures described below.

For this type of study, SHPO has agreed that a feasibility or preliminary assessment is appropriate, which provides an awareness of potential cultural resource effects. They have advised, however, that an extensive survey investigation and determination of eligibility would occur during future phases of work for the preferred alternative. Thus, activities such as the preparation of eligibility forms typically submitted to the SHPO for a determination of potential historic or archaeological sites will be part of next phase of analysis for the preferred alternative.

[10]Due to the sensitive nature of historic and archaeological resources, figures depicting the locations of these sites have not been created for this section of the document.

During the assessment of cultural resources, an evaluation model was developed to predict the potential for archaeological resources in the study area based on known site locations and soil types. The model output suggests that there is high potential for undiscovered archaeological resources in a number of locations throughout the county.

4.6.1 No-Action Alternative (Baseline)

As indicated in Section 2, a review of cultural resource records showed that numerous historic sites and structures are present throughout the county. There are 10 recorded archaeological sites within or near the existing or proposed right-of-way for the No-Action Alternative (Baseline) (Table 4-38, on the following page). These sites would require field verification should they be affected by this alternative. Two of these sites are known to be Native American burial sites; however, their precise location and involvement by the No-Action Alternative (Baseline) needs to be confirmed during future steps of this project.

For the No-Action Alternative (Baseline), historic properties have only been identified where Phase 1 preliminary engineering and detailed environmental studies have been advanced and potential impacts identified. Given the expansiveness of the alternative, it was not practicable to assess other potential historic impacts. Based on available engineering and environmental documents, there are 13 historic sites that could potentially be affected by this alternative. One of these structures, the St. Sava Monastery, is on the NRHP. Four residences, which are part of a larger historic district, may be eligible for the NRHP. There are six other locally important sites, and two county landmarks that could potentially be affected by this alternative. For both historic and archaeological resources potentially affected by this alternative, further roadway refinements are expected in future phases of work which may avoid or reduce involvement or impact to these resources (Table 4-39, on the following page).

4.6.2 IL 53 Freeway/Tollway Alternative

Four recorded archaeological sites are located within the existing or proposed right-of-way (Table 4-40, on the following page). These sites include a historic farmstead, two prehistoric sites of unknown cultural affiliation, and an abandoned historic cemetery. A reconnaissance survey confirmed the presence of the cemetery and noted its neglected condition. For both historic and archaeological resources potentially affected by this alternative, further roadway refinements are expected in future phases of work which may avoid or reduce involvement or impact to these resources.

Of the historic sites reviewed along the proposed roadway improvements for the IL 53 Freeway/Tollway Alternative, three structures were found which have the potential to be eligible for inclusion on the NRHP (Figure 4-22, and Table 4-41, on the following page). These structures, which may be subject to Section 106, are all farmhouses with barns. Based on the current concept, the IL 53 Freeway/Tollway Alternative would directly impact all three of these structures.

4.6.3 IL 83/US 45 with US 12 Alternative

Two recorded archaeological sites are located within the existing or proposed right-of-way of

TABLE 4-38
Potentially Involved Archaeological Sites

Type of Site	General Affiliation
Habitation and Commercial	Historic
Habitation and Commercial	Historic
Habitation and Commercial	Historic
Burial, camp	Prehistoric
Burial	Prehistoric
Commercial	Historic
Unknown	Historic
Habitation	Historic
Habitation and commercial	Historic
Habitation	Historic

Due to the sensitivity of potential archaeological sites, location and other distinguishing information are not disclosed.

TABLE 4-39
Potentially Involved Eligible Historic Properties

Property	Location	Description
Monastery	IL 21 between IL 137 and Washington St.	St. Sava Monastery (on NRHP): 0.04 ha (0.1 ac) of a temporary construction easement
Farms	IL 21 between IL 137 and Washington St.	0.4 ha (1 ac) from two county designated landmarks: Stonehenge Farm and a Centennial Farm
Local Sites	IL 22 between US 14 and Quentin Rd	6 sites of local historic importance; however, none of the sites would be affected if the bypass alternative were selected
Historic District	IL 22 between IL 83 and US 41	Stone Gate Circle Historic District: a retaining wall would be constructed on the property line of 4 houses.

Only historic sites identified as part of other Phase 1 project have been identified for the No-Action Alternative (Baseline).

this alternative (Table 4-42, on the following page). These sites would require evaluation if they should be affected by this alternative. Both sites are prehistoric archaeological sites, with one dating from 8,000 BC to 800 AD. The other is a Native American burial mound dating from as early as 2,500 BC to as recent as 800 AD. These sites have not been confirmed to still be in existence. For both historic and archaeological resources potentially effected by this alternative, further roadway refinements would be expected in future phases of work which may reduce involvement or impact to these resources.

Of the historic sites reviewed, one structure along the proposed roadway improvements for the IL 83/US 45 with US 12 Alternative is listed on the NRHP, the David Adler Cultural Center. In addition, five structures were found that have the potential to be eligible for inclusion on the NRHP (Figure 4-23). These additional structures, which may be subject to Section 106, are a horse stable, two residences, one residence with a barn, and one residence with one set of building entrance piers. All of these structures would be directly affected by the IL 83/US 45 with US 12 improvements (Table 4-43, on the following page).

4.6.4 Summary of Cultural Resource Impacts

The assessment of potential historical and archaeological impacts relied upon the use of existing and available data only, and only limited field observations and reconnaissance. The assessment included neither extensive field investigation, nor determination of eligibility for sites with potential historic or archaeological value. The scope of the analysis, however, was considered appropriate for a preliminary cultural resource assessment of the study area, the wide range of

TABLE 4-40
Potentially Involved Archaeological Sites

Type of Site	General Affiliation
Burial, camp	Prehistoric
Cemetery	Historic
Farmstead	Historic
Camp	Prehistoric

Due to the sensitivity of potential archaeological sites, location and other distinguishing information is not disclosed.

TABLE 4-41
Potentially Involved Eligible Historic Properties

Property	Location	Description
Residence	House with barn near the intersection of IL 83 and IL 137	House: 1.5 story; clapboarded; gable-front main block with cornice returns; gabled ell; asphalt roof; historic front porch with bands of tall windows that feature six-pane transoms. Contemporary barn: gambrel roof with a hay hood; shed roof dormer with a 6-over-6, double-hung sash window; vertical board siding; 4-pane garage doors.
Residence	House with barn near the intersection of I-94 and IL 120	House: 2-story; gabled (T-plan); clapboarded; 2-over-2 and 6-over-6, double-hung, wood sash windows; molded window hoods; 1-story, wrap-around porch on ell. Contemporary garage: asphalt, gable roof; 6-over-6, double-hung, wood sash windows; multiple hinged, 4-pane doors.
Residence	House with shed and barn near the intersection of Hicks Road and Long Grove Road	House: 2-story; clapboarded; multiple additions; asphalt roof; 6-over-1, double-hung, wood sash windows predominate; historic, clapboarded utility shed and garage; gambrel roof barn and 1-story, stuccoed outbuilding on the other side of the fence may have been historically associated with this property.

alternatives considered, and the concept stage of engineering detail, with the understanding that future engineering steps would further minimize or eliminate effect to these resources. The resource agencies involved in the study, including the IHPA, have concurred that this level of detail is appropriate for an analysis of feasible alternatives.

Throughout this study, efforts to avoid or minimize impacts to important environmental and social resources, including historical and archaeological resources, have taken place. These efforts have included reduced roadway footprints in spot locations and roadway alignment shifts. For example, some of the major shifts included the use of community bypasses to avoid important community resources. Future steps for the preferred alternative will include further efforts to avoid or minimize possible effects, field investigations fully compliant with the current practices, and identification of mitigation measures where impact is unavoidable.

TABLE 4-42
Potentially Involved Archaeological Sites

Type of Site	General Affiliation
Mound	Unknown
Burial, camp	Prehistoric

Due to the sensitivity of potential archaeological sites, location and other distinguishing information is not disclosed.

TABLE 4-43
Potentially Involved Eligible Historic Properties

Property	Location	Description
Forest Preserve Office (Grainger Woods)	Forest Preserve office near the intersection of St. Mary's Road and IL 60	Forest Preserve office: 2-story; decorative half-timbered upper story; stuccoed; asphalt gambrel roof; brick foundation above grade; multi-pane windows; brick window sills; associated historic stuccoed stables and modern stables.
Residence	House near the intersection of St. Mary's Road and IL 176	House: Tudor Revival style; 1.5-story; half-timbered; stuccoed; wood shingle, steeply-pitched, side-gable roof; wood sash bay windows; modern casement windows; brick window sills; exterior chimney composed of a cut-stone, irregular-coursed lower-half and brick upper-half; unsympathetic, 1-story, shed-roof rear addition; modern, detached garage.
Cultural Center (David Adler)	Listed on the National Register of Historic Places, located near the intersection of IL 21 and IL 137	Center: large, linear complex of attached buildings; cross-gable main block; stuccoed; wood shingle roof; 6-over-6, double-hung, wood sash windows predominate; fanlight over street-facing entrance on the main block; multiple chimneys; corner tower.
Residence and Entrance Piers	House near the intersection of I-94 and IL 60	House: 2.5-story; wood shingle, gable roof; vinyl-siding; arched and multi-pane windows; 2 corbeled chimneys. Stables: 1-story with 1.5-story, gable-front blocks; east end appears to have been converted into a residence. Two sets of wood entrance piers
Residence	House near the intersection of Hicks Road and Long Grove Road	House: 2-story; clapboarded; multiple additions; asphalt roof; 6-over-1, double-hung, wood sash windows predominate; historic, clapboarded utility shed and garage; gambrel roof barn and 1-story, stuccoed outbuilding on the other side of the fence may have been historically associated with this property.
Residence	House near the intersection of Hick Road and Old Hicks Road	House: Queen Anne style; 2-story with a 1.5 story rear wing; gable-front, wood shingle roof; gableboard with spindlework; brick foundation; wood clapboards; alternating fishscale and cove wood shingles in the peak of the gable; 1-over-1, double-hung, wood sash windows with ornamental hoods; 1-story porch with spindlework on the east facade of the wing.

Agency coordination would occur during this phase including federal agencies, SHPO, Tribal Historic Preservation Officers, Indian tribes, local governments, and other public parties.

Table 4-44 summarizes the potentially affected historic and archaeological resources.

4.7 Special Waste

A special waste database search was conducted to identify known or potential contamination from regulated substances within the proposed corridors for project alternatives. The existence of special waste in the study area was reviewed to identify current and historical activities on or near the roadway improvements. The information contained in this document relied upon reasonably ascertainable site information provided by others. A search was conducted of standard federal, state, and local environmental databases. The following is a partial list of the principal databases searched to identify generator and transporters of hazardous wastes; hazardous waste treatment, storage, and disposal facilities; and sites where releases of hazardous materials have been reported:

- USEPA Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS) list of sites either proposed for or on the National Priorities List (NPL), and sites in the screening and assessment phase for possible inclusion on the NPL (last update 4/00)
- USEPA NPL of uncontrolled or abandoned hazardous waste sites identified for priority remedial action (last update 6/00)
- USEPA Resource Conservation and Recovery Information System (RCRIS) list of sites that generate, transport, store, treat, or dispose of hazardous waste (last update 6/00)
- USEPA database of Resource Conservation and Recovery Act (RCRA) facilities undergoing corrective action (CORRACTS) because there was a release of hazardous waste or constituents into the environment from a RCRA facility (last update 4/00)
- U. S. Department of Transportation (USDOT) Hazardous Materials Information Reporting System (HMIRS) lists hazardous material spill incidents (last update 6/99)
- Illinois Environmental Protection Agency (IEPA) State Hazardous Waste Sites (SHWS) lists sites that may or may not be listed on the CERCLIS list (last update 1/00)
- IEPA Available Disposal for Solid Waste in Illinois (LF) lists solid waste disposal facilities or landfills in Illinois (last update 5/00)
- IEPA database of Leaking Underground Storage Tank (LUST) sites with reported LUST incidents (last update 7/00)

A site reconnaissance also was performed, consisting of a windshield survey to verify site

TABLE 4-44
Potentially Affected Historic and Archaeological Resources

Alternative	Historic Structures	Archaeological Sites
No-Action Alternative (Baseline)	13*	10
IL 53 Freeway/Tollway	3	4
IL 83/US 45 with US 12	6	2

*Based on available Phase 1 preliminary engineering and environmental documentation reports.

locations from the database. Other investigations consisting of sampling, monitoring, analytical, geotechnical, and site owner interviews were not conducted. The database search concluded that each alternative could encounter uncontrolled special waste sites, above ground storage tanks, or LUSTs.

A broad risk assessment was applied to each project alternative based upon the types of sites encountered. The ranking guidelines were based primarily on the environmental database and records review. This ranking system ranges from 1, indicating a property with a high potential for contamination/cleanup costs, to 3, indicating no evidence of releases.

- Rank 1—High Risk: Sites identified as requiring rigorous remediation (i.e., RCRIS-TSD, State Hazardous Waste site, CERCLIS, CORRACTS, RAATS)
- Rank 2—Moderate Risk: LUST sites except those with a No Further Action (NFA) designation by IEPA.
- Rank 3—Low Risk: Sites using hazardous materials but having no indication of releases from those materials.

4.7.1 No-Action Alternative (Baseline)

The No-Action Alternative (Baseline) would not directly affect any CERCLIS sites. Two CERCLIS sites are within 1.6 km (1 mi) of improvements (Figure 4-24). Grayslake Gelatin is 1.6 km (1 mi) south of Washington Street in Grayslake. Peterson Sand and Gravel is 0.8 km (0.5 mi) east of the intersection of IL 21 and IL 137. (This site however was purchased by the Lake County Forest Preserve in the late 1980's and subsequently cleaned up.) The potential for this alternative to encounter any contaminants from either site is low. Twenty LUST sites are within the proposed right-of-way for the No-Action Alternative (Baseline) improvements, and 27 LUST sites immediately outside the proposed right-of-way for this alternative's improvements. The potential risk for this alternative related to the LUST sites is moderate. It is anticipated that some or many of these sites have releases that would affect the right-of-way and would require cleanup.

4.7.2 IL 53 Freeway/Tollway Alternative

The IL 53 Freeway/Tollway Alternative would not directly affect any CERCLIS sites. The inventory of known sites shows that six sites (Figure 4-25) would be within 1.6 km (1 mi) of the improvements for the IL 53 Freeway/Tollway Alternative, including the ARF Landfill (now Waste Management Countryside Landfill), Skokie Valley Asphalt (now Curran Contracting), Grayslake Gelatin, and EDCO/S&S Landfill, all in Grayslake. Near the south end of proposed improvements, the Arlington Heights Landfill and Lennon Wallpaper (Cook County) are also within 1.6 km (1 mi) of the proposed improvements. The potential for this alternative to encounter any contaminants from these sites is low. The proposed IL 53 Freeway/Tollway Alternative is mainly on new alignment; therefore, this alternative would encounter few LUST sites, if any, along the mainline improvement. However, three LUST sites may be affected along feeder road improvements for this alternative. Overall, the potential risk associated with this alternative related to the LUST sites would be low.

4.7.3 IL 83/US 45 with US 12 Alternative

The IL 83/US 45 with US 12 Alternative may require a permanent easement from one listed CERCLIS site. The site, Peterson Sand and Gravel, was purchased by the Lake County Forest Preserve in the early 1980s and subsequently cleaned up. Other known sites within 1.6 km (1 mi) of improvements for this alternative include the ARF Landfill (now Waste Management Countryside Landfill), Skokie Valley Asphalt (now Curran Contracting), Grayslake Gelatin, and EDCO/S&S Landfill, all in Grayslake; and Lakeland Estates in Wauconda, within 0.8 km (0.5 mi) northeast of the IL 59 and US 12 interchange. At the south end of IL 53, in Cook

County, the Arlington Heights Landfill and Lennon Wallpaper are within 1.6 km (1 mi) of the project alternative (Figure 4-26). None of the CERCLIS-listed sites would pose a risk for this alternative. Thirty-four LUST sites are within the proposed rights-of-way for these improvements. Fourteen other sites are immediately outside the right-of-way for the improvements. Based on the guidelines established above, the risk associated with this alternative related to the LUST sites would be moderate. It is anticipated that some or many of these sites have releases that would affect the right-of-way and would require cleanup.

4.7.4 Summary of Special Waste

The three alternatives would have different affects upon special waste sites. None would directly involve any CERCLIS sites. The alternatives would principally affect LUST sites. The IL 83/US 45 with US 12 Alternative could involve 34 sites and the No-Action Alternative (Baseline) 20; the IL 53 Freeway/Tollway Alternative would have three encroachments. In cases where a site cannot be avoided, further investigations would be conducted for the preferred alternative to determine the extent, and the areas of contamination would be managed and disposed of in accordance with Federal and State laws and regulations and in a manner that would protect human health and the environment.

4.8 Section 4(f) Considerations

The Section 4(f) analysis identified the potential impact to protected resources; that is, of publicly-owned public parks, recreation areas, wildlife and waterfowl refuges, and historic sites of national, state, or local significance. This assessment is intended to identify Section 4(f) resources likely to be involved, and to inform resource agencies and others of the potential involvement. It is fully recognized that further definition of the impacts and coordination with responsible jurisdiction agencies is necessary to determine the level of impact, if any, and appropriate mitigation in future phases of work for the preferred alternative. This section describes potential Section 4(f) impacts identified based upon available data and field reconnaissance appropriate for this level of analysis; however, future refinements could modify or eliminate the effects upon these resources. Through future stages of engineering analysis and refinement, this potential impact will be better understood and subsequently coordinated further with the responsible jurisdiction agencies.

As discussed in Section 3, *Alternatives*, the LCTIP alternatives development process considered environmental and societal resources throughout the study. Considerable efforts were made to avoid and/or minimize impacts to these resources, including Section 4(f) resources. These efforts resulted in less than 0.03 percent of impacts to parks in Lake County (across the range of alternatives considered--1.2 to 2.8 ha [3 to 7 ac] of parkland impacts), and less than 0.06 percent of impacts to forest preserve land in Lake County (across the range of alternatives considered—1.2 to 6.5 ha [3 to 16 ac]). Although, these efforts succeeded in minimizing resource impacts, each of the alternatives would have some impact on Section 4(f) resources. Further, given the large area covered by the alternatives, the differences between alternative impacts were not considered distinguishable. Therefore, at this stage of development and level of engineering detail it was not possible to dismiss alternatives because of a Section 4(f) involvement. As a result, alternatives dismissed earlier in the process may need to be revisited as part of future studies.

Formal Section (4) designation and evaluation will be the subject of future studies, to conclusively identify the nature and extent of any Section 4(f) impact. Thus, activities such as the preparation of eligibility forms typically submitted to the SHPO for a determination of potential historic or archaeological sites will be part of next phase of analysis.

In this section standing structures, forest preserve and local park impacts that may

require Section 4(f) coordination are identified. Standing structures are also discussed in Section 4.6, *Cultural Resource Impacts*. At this point no state or federal recreation lands and wildlife refuges impacts have been identified.

4.8.1 Description of Potentially Involved 4(f) Resources

Section 4(f) resources that may be involved include county forest preserve lands, local parks, and standing structures. In Lake County these resources are abundant, with more than 8,090 ha (20,000 ac) of forest preserve, over 6,070 ha (15,000 ac) of local parks, and numerous standing historical structures. After three successive rounds of engineering refinements to avoid impacts to these resources, some sites may still be involved. Following is a description of the potentially involved Section 4(f) resources.

Nineteen Lake County forest preserves are identified as Section 4(f) properties that lie within the No-Action Alternative (Baseline) or build alternatives. Table 4-45 (on pages 4-63 through 4-65) lists the properties, their amenities, and uses. Eighteen local municipal parks have been identified as Section 4(f) resources that lie within the No-Action Alternative (Baseline) or build alternatives. Table 4-46 (on page 4-66) lists the properties, their amenities, recreational uses, and operating entities. Twenty-two eligible historic properties are identified as Section 4(f) properties that may lie within the No-Action Alternative (Baseline) or build alternatives. Eligibility is based on whether a site is included on or eligible for inclusion on the NRHP. The potentially involved properties are described in Table 4-47 (on page 4-67 and 4-68). However, for the No-Action Alternative (Baseline) projects, historic properties have been identified only where Phase 1 preliminary engineering and detailed environmental studies have been advanced and potential impacts identified. Given the expansiveness of the alternatives, it was not practicable to assess whether there were other potentially eligible historic sites for the No-Action Alternative (Baseline). As agreed to by the IHPA, cultural resources will be evaluated in greater detail under the preferred alternative to determine eligibility for inclusion in the NRHP.

4.8.2 Potential Section 4(f) Resource Impacts

4.8.2.1 No-Action Alternative (Baseline)

The No-Action Alternative (Baseline) could potentially affect 22 Section 4(f) forest preserve and local park properties throughout Lake County (Table 4-48, on page 4-69, and Figure 4-27). Generally, encroachment of these properties would be less than 1 percent of the total land area. However, there are two exceptions: both the Bannockburn Forest Preserve and Heather Ridge Golf Course would have larger area uses of 2.1 percent and 20.4 percent, respectively.

Most of the impacts are minor, requiring small amounts of land, most developed facilities and recreational use areas associated with the Section 4(f) properties would not be involved. Most of the impacts would affect the edges of the properties and would have little influence on developed facilities or natural resources. There are several exceptions, however, including potential impacts to recreational trails at Rollins Savanna, Deer Grove, and Prairie Wolf Forest Preserve; wetland involvement at Site 15; potential impacts to special habitat at Rollins Savanna; and potential impact to golf course operations at Heather Ridge.

The No-Action Alternative (Baseline) could potentially impact 14 LCFPD properties and eight local parks, with an estimated total loss of 6.9 ha (17.14 ac), representing less than 1 percent of the total area associated with the affected properties. Overall, the potential impacts to individual sites are small; however, one site potentially has an impact greater than 1 percent of the total land area for the site (Table 4-48).

TABLE 4-45
Potentially Involved Lake County Forest Preserves

Parcel	Location	Size	Description of Lake County Forest Preserves
Almond Marsh	South of IL 120 and east of US 45, along an unnamed tributary to the Des Plaines River	124 ha (306 ac)	The site incorporates an INAI site of the same name and two nature preserves identified as Almond Marsh and Oak Openings. A third nature preserve is 1.2 km (0.75 mi) south (Liberty Prairie Nature Preserve). No developed facilities are present.
River Hill	North of IL 120, east of IL 21, immediately south of Gurnee Woods	90 ha (224 ac)	This preserve is bisected by the Des Plaines River. There are no nature preserves or INAI sites associated with this preserve, nor any developed facilities.
Buffalo Creek Forest Preserve	North of Lake-Cook Road, between Arlington Heights Road and IL 53	160 ha (416 ac)	Includes tall-grass prairie with some small wetlands and Buffalo Creek. A wide range of birds, such as bobolinks, meadowlarks, and pheasants, occupy this preserve, and the state endangered Cormorant has been recorded at this site. Activities and facilities at Buffalo Creek include trails, picnic facilities, parking, and fishing. There are no nature preserves or INAI sites. Parts of this site were purchased with OSLAD funds. If it is determined that there would be impact this portion of the site as a part of future analysis, there would need to be coordination with IDNR similar to the coordination procedures for Section 6(f) properties.
Countryside Golf Course	West of US 45/IL 60 and both north and south of Hawley Road in Mundelein	200 ha (494 ac)	Amenities include the golf course, banquet facilities, pro shop, driving range, parking, restrooms, and concessions.
Wright Woods	South to IL 22 from Grainger Woods on the north and its western boundary of IL 21	132 ha (327 ac)	Includes a rich oak and maple woodland. Pretty sedge (*Carex woodii),* a state-listed endangered species, is found at this site. Activities include fishing and facilities include trails, parking, restrooms, and picnic and playground areas. A trail extends south 1.6 km (1 mi) to Ryerson Woods and is not contiguous to the Des Plaines River. The Des Plaines River bisects most of this site.
Grainger Woods	Southeastern Lake County near Mettawa, south of MacArthur Woods	104 ha (257 ac)	The purple-fringed orchid (*Habenaria peramoena*) is a federal (threatened) and state-listed endangered species found in this forest preserve. Activities and facilities are limited to equestrian lessons and boarding. The 43 ha (105 ac) Lloyd's Woods Nature Preserve is between the Grainger Woods and Wright Woods/Half Day Forest preserve on the south. A majority of the Grainger Woods Site is roughly 0.8 km (0.5 mi) east of the Des Plaines River, but a narrow belt of land extends along the river connecting this site to MacArthur Woods and Wright Woods.
Half Day Woods	East of Wright Woods	81 ha (201 ac)	This preserve consists of oaks and stands of native prairie. Activities include fishing and ice-skating. Facilities at this preserve include trails, picnic and playground areas, and an athletic field. This site extends over the watershed divide into the Chicago River basin. There are no nature preserves or INAI sites associated with either Wright Woods or Half-Day Woods.

TABLE 4-45 CONTINUED
Potentially Involved Lake County Forest Preserves

Parcel	Location	Size	Description of Lake County Forest Preserves
MacArthur Woods Forest Preserve	South of the EJ&E Railroad on the east side of the Des Plaines River and north of IL 60	207 ha (511 ac)	Includes a dedicated nature preserve located in the eastern portion of the woods. The southern portion of this site extends along the river to Grainger and Wright Woods. This site incorporates both a nature preserve and an INAI site of the same name. No developed facilities are present.
Independence Grove	South of River Hill, immediately north of IL 137	448 ha (1,106 ac)	Currently under development in central Lake County along the Des Plaines River. The LCFPD headquarters are located at Independence Grove, and amenities include a dog exercise area and trails. This site includes a wetland restoration site east of IL 21. There are no nature preserves adjacent to this site, but the 19 ha (47 ac) Liberty Prairie Nature Preserve is located roughly 0.8 ha (0.5 mi) west of Independence Grove. The St. Francis Boys Camp and the River Road Woods INAI sites are located within the boundaries of this forest preserve site, east of the Des Plaines River.
Wilmont Woods Forest Preserve	South of IL 137 and east of IL 21	57 ha (142 ac)	There are multiple-use trails within the site. This site is located at the confluence of Meadow Haven Creek, Tributary Number 1, and the Des Plaines River.
Old School Forest Preserve	Near Libertyville in south-central Lake County, south of IL 176. The western boundary is St. Mary's Road and the eastern boundary is I-94. A portion of the site extends west of St. Mary's Road to the Des Plaines River	200 ha (494 ac)	Includes oak woodlands and small prairies. This land was acquired in parcels between 1974 and 1976. This was the first forest preserve in Illinois to combine native prairie restoration with recreational facilities. Wildlife includes bluebirds, fox, and owls. Activities include trails, fishing, picnic and playground facilities, parking, restroom facilities, sledding, and sports fields. This preserve is connected by trails north of IL 176 to Independence Grove and Wilmont to the north (1.6 km [1 mi]) and via a greenbelt along the EJ&E railroad to MacArthur Woods, roughly 0.8 hectare (0.5 mile) south. There is a 0.3 ha (0.75 mi) section of the river between Old School and MacArthur Woods that does not contain forest preserves or trails, disrupting the continuous greenbelt to the Wisconsin border along the river. There are no nature preserves or INAI sites.
Bannockburn Forest Parcel	2.4 km (1.5 mi) east of Ryerson Woods and 1.6 km (1mi) southwest of Prairie Wolf Forest Preserve	32 ha (79 ac)	Bannockburn Forest Preserve is a small isolated preserve. A portion of the East Fork of the Chicago River runs through this site. There are no nature preserves or INAI sites associated with this preserve, nor developed facilities.
Prairie Wolf Forest Preserve	Along IL 60 about 1.6 km (1 mi) east of I-94.	175 ha (431 ac)	Prairie Wolf is a new development that includes a wetland restoration site. Activities include biking, skiing, and hiking trails. This site extends nearly 3.2 km (2 mi) along the Middle Fork. A complex of small nature preserves and INAI sites are located 0.8 km (0.5 mi) east of this forest preserve. The nature preserves are Highmoor Park and Hybernia. The INAI sites are known as the Hybernia-Highmoor Prairie.
Des Plaines River Trail	South of IL 173 along the Des Plaines River.	1,342 ha (3,314 ac)	Incorporates parts of the Wadsworth Prairie Nature Preserve and the Wadsworth Prairie and Savanna INAI sites. No developed facilities are present at the site.

TABLE 4-45 CONTINUED
Potentially Involved Lake County Forest Preserves

Parcel	Location	Size	Description of Lake County Forest Preserves
Site 15	Along the Middle Fork of the North Branch of the Chicago River, south of IL 137	31 ha (77 ac)	This site is at the south end of an extensive ADID wetland area that extends north along the Middle Fork. There are no nature preserves near this site, but three small INAI sites are associated with Site 15, including two separate sites known as the Oak Grove White Fringed Orchid Site North, and the Oak Grove White Fringed Orchid Site. These INAI sites lie immediately adjacent to the Union Pacific Railroad tracks. No developed facilities are present at this site.
Ryerson Woods	Situated on the east side of the Des Plaines River and extends from south of Duffy Lane to the Cook County Line	223 ha (550 ac)	Land was donated to the Lake County Forest Preserve beginning in 1966. Several rare species are found in Ryerson Woods including the spotted salamander (*Ambystoma maculatum*), blue-spotted salamander (*Ambystoma sp.*), and wood frog (*Rana sylvatica*); state threatened or endangered species eastern massasauga rattlesnake (*Sistrurus catenatus*), red-shouldered hawk (*Buteo lineatus*), veery (*Catharus fuscescens*), and the purple-fringed orchid are also present. This nature preserve houses a rare northern flatwoods forest and has most of the high quality floodplain forest that remains in northeastern Illinois. Activities and facilities include a visitor/nature center, banquet facilities, and trails. Approximately 113 ha (279 ac) are dedicated Illinois nature preserves of the same name. The Edward Ryerson Conservation INAI site is incorporated partially within the boundaries of this forest preserve site and the Hermann's Woods INAI sites is 0.16 km (0.1 mi) east of Ryerson Woods Forest Preserve. Ryerson Woods forms a linear greenbelt along the Des Plaines River for almost 42 km (26 mi).
Deer Grove Forest Preserve	Between Ela and Hicks Roads and north of Dundee Road in Cook County	729 ha (1,800 ac)	This forest preserve has bicycle and equestrian trails, walking paths, and picnic shelters. This forest preserve can be accessed from either Dundee or Quentin Road.
Rollins Savanna	Immediately west of US 45 and Third Lake, south of Rollins Road in central Lake County	496 ha (1,224 ac)	State-listed endangered species found at this site include such fish as the Iowa darter (*Etheostoma exile*) and the Sandhill crane (*Grus canadensis*). Activities are limited to snowmobile trails. There are no nature preserves or INAI sites associated with the Rollins Savanna. This is the southernmost portion of a 16 km (10 mi) crescent of open lands and lakes, with few interruptions, that extends west and north to the Red Wing Slough INAI site near the Wisconsin state line.
Brae Loch Golf Course	Along the west side of US 45 between Washington Street and IL 120 in the Village of Grayslake	65 ha (161 ac)	The Brae Loch Golf Course offers banquet facilities and gift shop.

Source: Lake County Forest Preserve District 2000

TABLE 4-46
Potentially Involved Parks

Jurisdiction	Description of Local Municipal Parks
Mundelein Park District	Leo Leathers Park is a 13 ha (32 ac) facility located south of IL 176, between IL 83 and US 45. Access to this facility is off of a local street at the south end of the property. The park offers a variety of recreational amenities, including a lake and a trail system.
Lake Zurich Park District	Sparrow Ridge Park, a 1.2 ha (3 ac) facility, is located on the west side of Rand Road (US 12) south of Old Rand Road. The park contains a playground and a retention basin. The area near Rand Road is fenced and wooded. Paulus Park is a 17 ha (42 ac) facility located on the east side of Rand Road (US 12), north of IL 22. Paulus Park offers a wide variety of activities including swimming, picnicking, sledding, and skating.
Village of Long Grove	Open Space A is 0.78 ha (0.94 ac) and is located on the east side of IL 83 and north of Gilmer Road along Indian Creek. Open Space B is 10.1 ha (24.89 ac) and is located on the west side of IL 83 and north of Gilmer Road. Open Space C is 5.26 ha (13 ac) and is located on the south side of Hicks Road at Old McHenry Road. There is no vehicular access to this site. The only amenity is a trail. Open Space D is 14 ha (34 ac) and is located on the west side of IL 83, south of IL 22. The only amenity is a trail.
Long Grove Park District	Oak Hills Park is located at the southeast corner of IL 83 and IL 22. There are currently no amenities or facilities at this 23.47 ha (58 ac) site. This park is a 10-year prairie restoration project and a future trail is planned.
Vernon Hills Park District	Royal Oaks Park is a 2 ha (5 ac) facility located on the east side of IL 83, south of US 45. There are no amenities or facilities at this location.
Village of Vernon Hills	Vernon Hills A Conservation area is 0.95 ha (2.38 ac) and is located on the east side of IL 83 south of IL 60. Vernon Hills B Conservation area is 2.4 ha (6 ac) and is located on the east side of IL 83 south of IL 60 and north of VHA Conservation.
Libertyville Township Open Space District.	This property is located on the west side of St. Mary's Road, south of IL 137. It is a 19.42 ha (48 ac) site with an established trail system that connects to adjacent residential areas.
Other Local Park Uses	The Chevy Chase Golf Course is a 51.39 ha (127 ac) course located on the west side of IL 21, just north of Lake-Cook Road, in Wheeling. Facilities include public golf, a driving range, concessions, restrooms, and banquet facilities. Heather Ridge Golf Course is 2.5 ha (6.29 ac) and is located on the west side of IL 21 north of IL 120. The Lake County Fairgrounds is 36.1 ha (89.02 ac) and is located west of US 45 between IL 120 and Central Avenue in the Village of Grayslake. Lafferty Park is a 6.2 ha (40.0 ac) park in the Village of North Barrington, Ela Township. Knox Park is a 4.9 ha (12.1 ac) park in the Village of North Barrington, Ela Township. A conservancy area, of unknown size, is located on the northwest corner of Gardner Road and IL 22 in North Barrington.

TABLE 4-47
Potentially Involved Eligible Historic Properties

Property	Location	Description	Involved Alternative		
			No-Action*	IL 53 Freeway/Tollway	IL 83/US 45 with US 12
Monastery	IL 21 between IL 137 and Washington St.	St. Sava Monastery (on NRHP): 0.04 ha (1 ac) of a temporary construction easement	X		
Farms	IL 21 between IL 137 and Washington St.	0.4 ha (1 ac) from two county designated landmarks-Stonehenge Farm and a Centennial Farm	X		
Local Sites	IL 22 between US 14 and Quentin Rd	6 sites of local historic importance; however none of the sites would be affected if the bypass alternative were selected	X		
Historic District	IL 22 between IL 83 and US 41	Stone Gate Circle Historic District: a retaining wall would be constructed on the property line of 4 houses.	X		
Residence	House with barn near the intersection of IL 83 and IL 137	House: 1½ story; clapboarded; gable-front main block with cornice returns; gabled ell; asphalt roof; historic front porch with bands of tall windows that feature six-pane transoms. Contemporary barn: gambrel roof with a hay hood; shed roof dormer with a 6-over-6, double-hung sash window; vertical board siding; 4-pane garage doors.		X	
Residence	House with barn near the intersection of I-94 and IL 120	House: 2-story; gabled (T-plan); clapboarded; 2-over-2 and 6-over-6, double-hung, wood sash windows; molded window hoods; 1-story, wrap-around porch on ell. Contemporary garage: asphalt, gable roof; 6-over-6, double-hung, wood sash windows; multiple hinged, 4-pane doors.		X	
Residence	House with shed and barn near the intersection of Hicks Road and Long Grove Road	House: 2-story; clapboarded; multiple additions; asphalt roof; 6-over-1, double-hung, wood sash windows predominate; historic, clapboarded utility shed and garage; gambrel roof barn and 1-story, stuccoed outbuilding on the other side of the fence may have been historically associated with this property.		X	
Forest Preserve Office (Grainger Woods)	Forest Preserve office near the intersection of St. Mary's Road and IL 60	Forest Preserve office: 2-story; decorative half-timbered upper story; stuccoed; asphalt gambrel roof; brick foundation above grade; multi-pane windows; brick window sills; associated historic stuccoed stables and modern stables.			X

TABLE 4-47 CONTINUED
Potentially Involved Eligible Historic Properties

Property	Location	Description	Involved Alternative		
			No-Action*	IL 53 Freeway/Tollway	IL 83/US 45 with US 12
Residence	House near the intersection of St. Mary's Road and IL 176	House: Tudor Revival style; 1½-story; half-timbered; stuccoed; wood shingle, steeply-pitched, side-gable roof; wood sash bay windows; modern casement windows; brick window sills; exterior chimney composed of a cut-stone, irregular-coursed lower-half and brick upper-half; unsympathetic, 1-story, shed-roof rear addition; modern, detached garage.			X
Cultural Center (David Adler)	Listed on the National Register of Historic Places, located near the intersection of IL 21 and IL 137	Center: large, linear complex of attached buildings; cross-gable main block; stuccoed; wood shingle roof; 6-over-6, double-hung, wood sash windows predominate; fanlight over street-facing entrance on the main block; multiple chimneys; corner tower.			X
Residence and Entrance Piers	House near the intersection of I-94 and IL 60	House: 2½-story; wood shingle, gable roof; vinyl-siding; arched and multi-pane windows; 2 corbeled chimneys. Stables: 1-story with 1½-story, gable-front blocks; east end appears to have been converted into a residence. Two sets of wood entrance piers.			X
Residence	House near the intersection of Hicks Road and Long Grove Road	House: 2-story; clapboarded; multiple additions; asphalt roof; 6-over-1, double-hung, wood sash windows predominate; historic, clapboarded utility shed and garage; gambrel roof barn and 1-story, stuccoed outbuilding on the other side of the fence may have been historically associated with this property.			X
Residence	House near the intersection of Hick Road and Old Hicks Road	House: Queen Anne style; 2-story with a 1½-story rear wing; gable-front, wood shingle roof; gableboard with spindlework; brick foundation; wood clapboards; alternating fishscale and cove wood shingles in the peak of the gable; 1-over-1, double-hung, wood sash windows with ornamental hoods; 1-story porch with spindlework on the east facade of the wing.			X

*Only historic sites identified as part of other Phase 1 project have been identified for the No-Action Alternative (Baseline).

TABLE 4-48
Summary of Potential Forest Preserve and Local Park 4(f) Impacts for the No-Action Alternative (Baseline) [a]

Property	Owner	Total ha (ac)	Affected ha (ac)	% Affected	Potential Use
Bannockburn Forest Preserve	LCFPD	31.8 (79)	0.67 (1.66)	2.11	No recreational facilities
Grainger Woods	LCFPD	104 (257)	0.02 (0.06)	0.02	Minimal impact
Independence Grove	LCFPD	448 (1,106)	0.77 (1.9)	0.16	LCFPD headquarters; dog exercise area, trails unaffected
Prairie Wolf Forest Preserve	LCFPD	175 (431)	0.93 (2.29)	0.53	Potential biking, hiking, skiing uses
Ryerson Woods	LCFPD	222.5 (550)	0.11 (0.26)	0.05	Uses at edge of property only
Wright Woods	LCFPD	132 (327)	0.13 (0.33)	0.10	Uses to southern perimeter
Countryside Golf Course	LCFPD	200 (494)	0.15 (0.38)	0.08	No anticipated uses to golf course facility
Des Plaines River Trail	LCFPD	1,342 (3,314)	0.26 (0.64)	0.02	Uses to southern edge; part of parkland along river
Ryerson Woods	LCFPD	313 (772)	0.39 (0.96)	0.12	Uses at edge of property only
Site 15	LCFPD	31 (77)	0.05 (0.12)	0.19	Site contains ADID wetlands and INAI sites
Deer Grove	LCFPD	729 (1,800)	1.4 (3.48)	0.20	Potential impact to bike trail
Rollins Savanna	LCFPD	496 (1,224)	0.44 (1.10)	0.09	Presence of State-listed species, snowmobile trail
Brae Loch Golf Course	LCFPD	65 (161)	0.46 (1.13)	0.71	No anticipated uses to golf course facility
Half Day Woods	LCFPD	81.3 (201)	0.31 (0.77)	0.38	No recreational uses would be involved.
Paulus Park	Lake Zurich PD	17 (42)	0.09 (0.22)	0.53	No facilities located in the affected park will be affected.
Lafferty Park	Village of North Barrington	5.5 (13.6)	0.054 (0.13)	0.98	No facilities located in the affected park will be affected.
Knox Park	Village of North Barrington	4.9 (12.1)	0.017 (0.04)	0.35	Temporary construction easement. No facilities located in the affected park will be affected
Conservation Area	Village of North Barrington	Unknown	0.003 (0.007)	Unknown	No facilities located in the affected park will be affected
Heather Ridge B Golf Course	Gurnee	2.5 (6.3)	0.51 (1.27)	20.4	Potentially golf course and operations uses
Open Space B	Village of Long Grove	7.3 (18)	0.065 (0.16)	0.89	No recreational would be involved
Oak Hills Park	Long Grove Park District	24.3 (60)	0.076 (0.19)	0.30	Currently no recreational facilities; trail planned
Lake County Fairgrounds	Lake County	36 (89)	0.016 (0.04)	0.04	Uses to eastern edge of property
Total Area	**4,468.1 (11,034)**		**6.9 (17.7)**		

[a] See Table 4-47 for a summary of potentially eligible historic structures

The No-Action Alternative (Baseline) may involve 13 historic sites within the existing or proposed right-of-way (Table 4-48 and Figure 4-27). One site, the St. Sava Monastery which is listed on the National Register of Historic Places, could potentially be affected by a temporary construction easement (0.04 ha or 0.1 ac). A subdivision, comprised of 12 Lustron homes has been found to have the potential to be eligible for the NRHP as a historic district. Four of these residences may be potentially affected; a retaining wall would be constructed on the property line of these residences. The other structures include two county designated landmark farms and six locally important sites.

4.8.2.2 IL 53 Freeway/Tollway Alternative

The potential forest preserve and local park Section 4(f) resource impacts associated with the IL 53 Freeway/Tollway Alternative are summarized in Table 4-49 and Figure 4-28. Roughly 8.0 ha (20.1 ac) may be required for roadway improvements under this alternative from four LCFPD properties and one local park. Overall, the IL 53 Freeway/Tollway Alternative could affect 0.15 percent of the total land area represented by the involved sites.

The percentage of land area required from the forest preserve and local park properties would be relatively small compared to the total land areas. Most impacts to forest preserve properties would be fringe impacts, which would not affect developed facilities or recreational areas. Under the IL 53 Freeway/Tollway Alternative, Leo Leathers Park would be divided. Alternative centerlines for Leo Leathers Park and Almond Marsh were analyzed to identify avoidance options. The analysis resulted in higher wetland uses and displacements, so the current alignment was determined to be most practical (see Section 3). Direct impacts to the park include a small pond, a bike/pedestrian trail, and some natural vegetation, and so the resource would be bridged. Overall, potential impacts to individual sites are small, but there are four sites for which uses are greater than 1 percent of the total site land area (Table 4-49). Three historic structures were found to have the potential to be eligible for inclusion on the NRHP. These structures are all farmhouses with barns (Table 4-47 and Figure 4-28).

4.8.2.3 IL 83/US 45 with US 12 Alternative

Potential impacts to existing forest preserves and parks that could result from the IL 83/US 45 with US 12 Alternative are

TABLE 4-49
Summary of Potential Forest Preserve and Local Park 4(f) Impacts for the IL 53 Freeway/Tollway Alternative

Property	Owner	Total ha (ac)	Affected ha (ac)	% Affected	Potential Use
Almond Marsh	LCFPD	124 (306)	2.0 (5.0)	1.6	No recreational facilities
River Hill	LCFPD	90 (224)	2.6 (6.6)	2.9	Part of parkland corridor
Buffalo Creek Forest Preserve	LCFPD	160 (416)	0.6 (1.6)	0.4	Currently agriculture*
Countryside Golf Course	LCFPD	200 (494)	1.4 (3.5)	0.7	Golf facilities
Leo Leathers Park	Mundelein Park District	13 (32)	1.4 (3.4)	10.8	Passive recreation
Total Area	**587 ha (1,472 ac)**		**8.0 ha (20.1 ac)**		

Note: See Table 4-46 for a summary of potentially eligible historic structures
*Parts of this site were purchased with OSLAD funds. If it is determined that there would be impact this portion of the site as a part of future analysis, there would need to be coordination with IDNR similar to the coordination procedures for Section 6(f) properties.
Source: CH2M HILL 1999.

detailed in this section. There could be seven LCFPD properties and twelve local parks with an estimated total loss of 7.47 ha (18.51 ac) that could be potentially involved with this alternative (Table 4-50, on the following page, and Figure 4-29). Generally, the potential impacts to individual sites are small; however, there are seven sites for which uses are greater than 1 percent of the total land area for the site (Table 4-50). For Leo Leathers Park and Almond Marsh, an analysis of alternative centerlines and bypass options was performed to identify avoidance options. The analysis resulted in higher wetland uses and displacements; thus the current alignment was determined to be most practical (see Section 3). Most of the impacts would be fringe uses with minimal effect on developed facilities or recreational areas. Many of the impacts represent losses of natural vegetation, although none of these losses affect special or rare habitat. Impacts upon 10 sites could have some effect on trail facilities and/or access. Generally, these would be minor and could be mitigated.

One building, the David Adler Cultural Center, is on the NRHP. Five other structures, including a residence with one set of building entrance piers, were found which are potentially eligible for inclusion on the NRHP. See Table 4-47.

4.8.3 Summary of Potential Section 4(f) Resource Impacts

Potential Section 4(f) resource impacts could occur with each of the alternatives. A summary of the potential Section 4(f) property uses for each alternative is in Table 4-51 (on page 4-73).

The IL 83/US 45 with US 12 Alternative could potentially affect the most forest preserves and local parks with a greater than 1 percent loss, and historic properties. Comparatively, for all alternatives, the total impacts to Section 4(f) resources is small compared to the total area dedicated to forest preserves, parks, and cultural resources in Lake County. It is expected that future coordination, minimization and mitigation activities associated with the preferred alternative could result in a further reduction of these impacts.

4.9 Energy

Highway improvement projects can both consume and conserve fossil fuels. Consumption would occur as a result of both construction and operation of the project alternatives. Conservation would occur as a result of improved efficiency for travel.

Construction of the project alternatives would require the consumption of energy for processing construction materials, construction activities, and the long-term maintenance of 119.1 route km (74.0 mi) for the No-Action Alternative (Baseline), 42.7 route km (26.5 mi) for the IL 53 Freeway/Tollway Alternative, and 100.8 route km (62.7 mi) for the IL 83/US 45 with US 12 Alternative. Energy consumption by vehicles in the area may increase during construction due to possible traffic delays.

Construction of both build alternatives would reduce future traffic congestion and vehicular stopping and slowing conditions. Additional benefits would be realized from increased capacity and smoother riding surfaces. This would result in less direct and indirect vehicular operational energy consumption for the build alternatives than for the No-Action Alternative (Baseline). In the long term, post-construction operational energy efficiencies should offset construction and maintenance energy requirements and result in a net savings in energy usage.

Both build alternatives include provisions for improved bicycling and walking conditions, thereby encouraging travel by these nonmotorized, nonenergy-consuming modes of transportation. Additional nonmotorized, energy-efficient travel improvements, common to both project alternatives, consist of various recommended bus and rail improvements throughout the study area.

TABLE 4-50
Summary of Potential 4(f) Impacts for the IL 83/US 45 Alternative

Property	Owner	Total ha (ac)	Affected ha (ac)	% Affected	Potential Use
Almond Marsh	LCFPD	124 (306)[a]	1 (2.4)	0.8	Vegetation uses
Countryside Golf Course	LCFPD	200 (494)	0.05 (0.2)	0.03	Potential impact to trail and vegetation
MacArthur	LCFPD	207 (511)[a]	0.15 (0.37)	0.07	River access and trail uses
Independence Grove	LCFPD	448 (1,106)[a]	0.71 (1.76)	0.16	River access and trail uses
Old School Forest Preserve	LCFPD	200 (494)[a]	0.11 (0.27)	0.06	Access to facility, trail and underpass uses
Wilmont Forest Preserve	LCFPD	57 (142)[a]	0.23 (0.58)	0.4	Potential uses to Des Plaines River Trail and vegetation
Wright Woods/Half Day	LCFPD	132 (327)[b]	1.13 (2.8)	0.86	Potential uses to trail and vegetation
Sparrow Ridge Park	Lake Zurich PD	1.2 (3)	0.016 (0.04)	1.38	Impact to landscape buffer
Paulus Park	Lake Zurich PD	17 (42)	0.09 (0.22)	0.53	No recreational uses
Leo Leathers Park	Mundelein PD	13 (32)	0.84 (2.09)	6.46	Passive recreation
Open Space A	Long Grove	0.78 (0.94)	0.38 (0.94)	48.7	No recreational uses
Open Space C	Long Grove	5.26 (13)	0.5 (1.23)	9.5	Access, trail, and vegetation uses
Open Space D	Long Grove	14 (34)	0.14 (0.34)	1.0	Access, trail, and vegetation uses
Oak Hills Park	Long Grove Park District	23.47 (58)	1.57 (3.87)	6.7	Impact to open space and vegetation; no impact to restoration area
Royal Oaks Park	Vernon Hills Park District	2 (5)	0.02 (0.05)	1.0	Vegetation uses
Chevy Chase Golf Course	Wheeling	51.39 (127)	0.12 (0.31)	0.23	Access and parking uses
Libertyville Township Open Space	Village of Libertyville	19.42 (48)	0.18 (0.45)	0.9	Trail, access, and vegetation uses
VHA Conservation	Village of Vernon Hills	0.95 (2.38)	0.093 (0.23)	9.8	Impact along edge
VHB Conservation	Village of Vernon Hills	2.4 (6)	0.14 (0.36)	5.8	Impact at edges
Total Area	**1,518.9 ha (3,751.3 ac)**		**7.5 ha (18.5 ac)**		

Note: See Table 4-47 for a summary of potentially involved eligible historic properties
[a]CH2M HILL 1999 - GIS Database
[b]Lake Count Forest Preserve District 2000

4.10 Construction Impacts

Construction impacts are generally of short duration and end shortly after project completion. The expected short-term construction impacts associated with the No-Action and build alternatives are identified below.

4.10.1 Construction-Related Jobs

Table 4-52 lists the jobs generated per alternative, based on construction costs and an FHWA multiplier of 9.75 jobs per million dollars of construction. Project expenditures would also generate indirect and direct employment opportunities in industries that supply materials and overhead items to the project. Estimates of additional project related-work generated are based on the U.S. Department of Labor multiplier of 12.7 jobs per million dollars of construction.

4.10.2 Erosion and Sediment Control

Typical construction activities associated with bridges, culverts, and roadway approaches involve grading, filling, and excavation. These activities increase the erosion potential due to the reduction in vegetative cover and increased impervious areas resulting from soils disturbance by heavy equipment. Placement of structures in streams may increase turbidity (suspended solids) and sedimentation and temporarily alter downstream hydraulics and substrate conditions.

Covering of natural substrate is the potential result of increased sedimentation during construction, thereby affecting necessary habitat conditions for some species of fish, mussels, or macroinvertebrates. Impact magnitude would vary according to site-

TABLE 4-51
Summary of Potential Section 4(f) Impacts

	No-Action	IL 53 Freeway/Tollway	IL 83/US 45 with US 12
Number of Forest Preserves	14	4	7
Number of Local Parks	8	1	9
Total ha of Forest Preserve and Local Parks Involved (ac)	6.9 (17.1)	8.0 (20.1)	7.5 (18.5)
Number of Properties with Greater than 1 percent Loss of Area	2	3	9
Number of Historic Properties*	13	3	6

*Based on available Phase 1 preliminary engineering and environmental documentation reports.

TABLE 4-52
Jobs Generated per Alternative

	No-Action	IL 53 Freeway/Tollway	IL 83/US 45 with US 12
Jobs Generated[a]	3,300	6,600	7,200
Additional Project-Related Jobs Generated[b]	4,300	8,600	9,300
Estimated Construction Costs[c]	$338 million	$674 million	$735 million

[a]This estimate is based on a construction costs and a FHWA multiplier of 9.75 jobs per million dollars of construction
[b]This estimate is based on U.S. Department of Labor multiplier of 12.7 jobs per million dollars of construction
[c]Construction cost only (1999 dollars)

specific conditions, such as the type of crossing structure and stream substrate.

Erosion control measures would be implemented throughout the study area, in particular at stream crossings for the preferred alternative in accordance with IDOT policy as stated in *IDOT Joint Design/Construction Procedure Memorandum on Erosion and Sediment Control.* An erosion control plan must be prepared as part of the contract documents. These measures would minimize soil loss and subsequent sedimentation. Table 4-53 summarizes the stream crossings for each alternative. The magnitude of erosion control measures is commensurate with the number of stream crossings.

Each alternative would result in the disturbance of 0.4 or more ha (1 or more ac) of total land area. Accordingly, each is subject to the requirement for a NPDES permit for stormwater discharges from the construction site. This is discussed under Section 4-13, *Permits/Certifications*.

Areas of special concern where erosion and sediment control are needed would be identified in a detailed analysis of the preferred alternative.

4.10.3 Air Quality

The primary effect from construction upon air quality would be fugitive dust (particulate) from soil exposed to wind and traffic. The quantity of fugitive dust would vary depending on the construction location, extent of activity, silt content, soil moisture, temperature, and wind speed. Construction activities would generate fugitive dust that may be bothersome in nearby areas. However, the contribution of any of the alternatives to the total suspended particulates in the surrounding area would be small and of short duration. Generally, the overall impacts of each alternative would be similar.

During construction, blowing dust from areas cleared or excavated for access or construction purposes can be minimized by applying water to unpaved road surfaces. The effectiveness of watering for fugitive dust control depends on the frequency of application. It is estimated that watering an entire area twice daily would

TABLE 4-53
Summary of Stream Crossings by Alternative

Watershed	Subwatershed	No-Action	IL 53 Freeway/Tollway	IL 83/US 45 with US 12
Des Plaines River	Buffalo Creek	4	2	2
	Bull Creek	6	1	2
	Aptakisic Creek	3	—	1
	Indian Creek	8	5	8
	Mill Creek	5	1	1
	Middle Fork	2	—	3
	Upper Des Plaines	8	4	5
	Lower Des Plaines	3	—	5
	West Fork	3	—	—
	Arlington Heights Branch	2	—	—
Fox River	Flint Creek	3	—	1
	Fish Lake Drain	—	1	—
	Slocum Lake Drain	—	—	1
	Squaw Creek	—	1	—
	Tower Lake Drain	—	—	1
Total		**47**	**15**	**30**

reduce dust emissions by as much as 50 percent. These measures would be employed as needed during construction of the preferred alternative.

4.10.4 Construction Noise

Trucks and machinery used for construction produce noise that may affect some land uses and activities during the construction period. Individuals inhabiting the homes along the proposed improvements would at some time experience perceptible construction noise from implementation of the project. IDOT's *Standard Specifications for Road and Bridge Construction* as Article 107.35, adopted January 1, 1997, contains mitigation measures to minimize or eliminate the effects of construction noise on receptors.

4.10.5 Traffic/Temporary Access

Access to all properties would be maintained by staged construction temporary access roads or other appropriate means. Traffic may be stopped for short periods, temporarily inconveniencing motorists while construction equipment is moved on or across the highway. Emergency service routes and access for emergency vehicles would be maintained.

Road construction activities involve lane closures and detours. These activities interrupt normal traffic flow, and generally impede travel in the vicinity of road construction. Construction on existing roadways would cause greater traffic delay than construction on new alignments. Therefore, the IL 53 Freeway/Tollway Alternative would have less traffic delay associated with construction than the other project alternatives.

4.10.6 Solid Waste

In accordance with state and federal regulations, the contractor would dispose of grass, shrubs, trees, old pavement, miscellaneous debris, and other sold wastes generated during construction.

4.10.7 Utility Services

Construction activities would be coordinated with public utilities to avoid potential conflicts and minimize planned interruptions of service. When service interruptions are unavoidable, every effort would be made to limit their duration.

4.11 Secondary and Cumulative Impacts

4.11.1 Approach

Potential secondary and cumulative impacts are described in this section. These terms are defined as follows:

- *Secondary effects* are indirect impacts "caused by an action and are later in time or further removed in distance but are still reasonably foreseeable" (40 C.F.R 1508.8).
- *Cumulative effects* are "impacts which result from the incremental consequences of an action when added to other past and reasonably foreseeable future actions" (40 C.F.R 1508.7).

In 1997, the Council on Environmental Quality (CEQ) developed an 11-step approach to evaluate cumulative effects (see Table 4-54, on the following page). Steps 1 through 4 address scoping, which sets the boundaries for the analysis by narrowing the focus to meaningful issues and the sustainability of affected resources. Steps 5 through 7 describe the affected environment (resources, ecosystems, and human communities) in terms of the stresses it experiences and its response to change, capacity to withstand stresses, regulatory thresholds and baseline condition. Steps 8 through 11 determine the environmental consequences. The last four steps include cause-and-effect relationships, magnitude, significance, and measures to avoid, minimize, mitigate, monitor, and manage consequences. As noted, this analysis has determined that the secondary and cumulative effects of the project alternatives would be limited and controllable through mitigation and monitoring.

A review of the project impacts concluded that seven resource areas would potentially result in secondary and cumulative impacts **(Step 1)**,

which are summarized in Table 4-55 (on the following page).

The geographic extent of this analysis **(Step 2)** is shown in Figure 4-30, which captures the area of population growth attributed to the build alternatives. The additional population growth attributed to the build alternatives would be 18,000 for the IL 83 with US 12 Alternative, and 27,500 for the IL 53 Freeway/Tollway Alternative (see Section 4.1.1 for more detail). These increases are small compared to the 280,000 additional people projected to come to Lake County by 2020, with the No-Action Alternative (Baseline).

The time period for this analysis is 1990 through 2020 **(Step 3)**. This period included the periods 1990 to 2000 and 2001 to 2020. From 1990 to 2000, Lake County was characteristic of many suburban areas, with an outward shift in growth from established communities. Shoreline communities experienced slower growth or decline, while the central part experienced greater growth. During the 1990s, population growth and development was concentrated in the central part of the county and advanced into the western part. The latter part of the analysis period will see growth most pronounced in the western and north-central parts of the county. This period extends through the regional projection in the NIPC Land Use Plan (2020).

Other actions **(Step 4)** may cause secondary and cumulative effects on the resources, ecosystems, and human communities within the project corridor. These actions are under construction or are reasonably foreseeable, given their stage of planning and development. The impacts of these actions must be considered along with those of the finalist alternatives.

Substantial development in Lake County is expected to continue regardless of whether major transportation improvements are implemented. Most of the communities in the county are providing for new commercial and residential growth at a rapid pace. Expansion of these types of land uses typifies the reasonably foreseeable actions in the county, beyond the proposals presented in this document for major transportation improvements. Other specific actions identified within the project influence zone are

TABLE 4-54
Steps in Cumulative/Secondary Analysis

Environmental Impact Assessment Component	Analysis Steps
Scoping	1. Identify the significant cumulative effects issues associated with the proposed action, and define the assessment goals. 2. Establish the geographic scope for the analysis. 3. Establish the time period for the analysis. 4. Identify other actions affecting the resources, ecosystems, and human communities of concern.
Describing the Affected Environment	5. Characterize the resources, ecosystems, and human communities identified in scoping in terms of their response to change and capacity to withstand stresses. 6. Characterize the stresses affecting these resources , ecosystems, and human communities and their relation to regulatory thresholds. 7. Define a baseline condition for the resources, ecosystems and human communities.
Determining the Environmental Consequences	8. Identify important cause-and-effect relationships between human activities and resources, ecosystems, and human communities. 9. Determine the magnitude and significance of cumulative effects. 10. Modify or add alternatives to avoid, minimize or mitigate significant cumulative effects. 11. Monitor the cumulative effects of the selected alternative and adapt management.

the expansion of Motorola facilities in Deer Park, the Great Lakes Naval Training Center in North Chicago, and the proposed University Center in Grayslake. No other substantive actions have been identified within the project influence zone.

The affected environment analyses **(Steps 5-7)** characterizes the existing key resources, ecosystems and human communities in terms of their response to change; stresses imposed on them; their capacity to withstand these stresses; the pertinent regulations, standards and development plans that establish thresholds (levels of stress beyond which the desired condition degrades); and their current status (baseline condition). This information is summarized in Table 4-56 (on the pages 4-78 and 4-79). Four critical resources are discussed in further detail to provide a perspective of the existing conditions.

Wetlands. Currently, there are over 45,000 acres of wetlands in the county. Historically, the loss of wetlands was associated with agriculture. Today, the loss of wetlands is attributed to urban development. Regulatory requirements have effectively provided for the replacement of lost wetlands, slowing the loss of total wetland acres.

TABLE 4-55
Potential Cumulative/Secondary Effects

	Resources/Eco-systems/Human Communities	Potentially Important from Cumulative/Secondary Effects Perspective
Land Use	a. Relationship between land use and transportation b. Agricultural land conversion c. Socioeconomic d. Public services: medical, fire, police, educational, places of worship, cemeteries	a. Facilitate already establish growth trends b. Farm and farmland loss c. Population and employment growth, changing community cohesion, building displacements d. Overburdened services
Water Resources	a. Wetlands b. Floodplains c. Ground and surface water quality	a. Degradation or loss (erosion, filling), potential for more flooding, loss of biological resources b. Degradation or loss (erosion, filling), potential for more flooding c. Sedimentation; contamination from pollutants such as salt spray from deicing chemicals; altered hydrology, potential impact to designated water uses
Air Quality	a. Exceedance of standards for carbon monoxide and other air pollutants b. Long-range transport of air pollutants c. Conformity with State Implementation Plan	a.–c. Degradation of regional air quality; long-term human health effects.
Noise	Traffic-generated noise levels	Increases in traffic noise over existing conditions or noise abatement criteria
Cultural Resources	Historic structures and archaeological sites	Loss of resources or proximity effects
Sociocultural Resources	Demographics – impacts to racial, ethnic and special groups	Environmental justice – disproportionate impact to minority and low income groups.
Biological Resources	a. Flora and fauna diversity b. Habitat fragmentation c. Threatened and endangered species d. Intrusion into designated lands (e.g., nature preserves, forest preserves) e. Tree loss during construction	a.–e. Degradation of habitats and plant and animal populations; impacts from construction and ongoing operation

TABLE 4-56

Affected Environment

Resource	Response to Change	Stresses	Capacity to withstand Stresses	Regulatory Thresholds	Baseline Condition
Land Use	Increase in development, consumer services, and public services. Increase in Infrastructure demand (road, rail, bus, etc.). Utility.	Water resources, air quality, noise pollution, habitat reduction.	Regulations and standards are used to minimize adverse effects. Development standards can require compensatory storage and natural drainage measures to mitigate effects of new development.	County and municipal zoning and land planning ordinance; Lake County SMC and IDNR.	Suburban development widespread and rapidly expanding. Many municipalities have ambitious growth plans. Rural/low density suburban giving way to suburban/urban character.
Agricultural Land Conversion	Loss of prime farmland soils	Advancing development	Improving agricultural preservation initiatives and ordinances. Strengthen open space acquisition funds.	USDA Soil and Conservation Service; Illinois Department of Agriculture; county land management plans	Existing farmland is 20% of the county area, and diminishing at a rate of 3% per year.
Socio-economic	Increase in population and employment	Development is outpacing infrastructure. Decrease in mobility, increase in travel times and land density	Municipal providers responding to near term needs on a priority basis recognizing fiscal constraints Municipal planners encouraging infill growth, sensible growth initiatives, and growth near transportation.	Long range infrastructure planning provided by IDOT, ISTHA, county, and others, to improve transportation service	96% of the 2020 population will occur regardless of major transportation improvements
Public Services	Increase in demand for and access to education, health care, fire and police services, and transit	Increase in population and development, which increases demand on service.	An expanded tax base and increased revenues would help offset the costs of the increase in various services to expanding communities.	State, county, and municipality government provide the delivery of services, operation and long-term maintenance.	The study area is responding to growing demands on basic public services, however, trends show that population growth is outpacing needed infrastructure improvements.
Floodplains	Loss of floodplains	New Development and associated infrastructure improvements	The Lake County SMC, IDNR (OWR), and USACOE have ample regulatory authority to control encroachment upon floodways and floodplains, and provide compensatory storage as required.	Cognizant resource agencies enforce a policy of no net loss of flood storage through a permit review process.	Regulatory requirements have stabilized or slightly improved flooding in the area.
Wetlands	Direct impacts: loss of wetlands Indirect impacts: hydrology issues	Continued growth and development	Mitigation for wetlands is stabilizing the loss of wetland acreage.	IDNR, USACOE, and USFWS enforce a no net loss of resources for projects subject to federal and state jurisdiction.	45,700 acres of wetlands in Lake County. Losses have been stabilized by mitigation requirements.

TABLE 4-56 CONTINUED
Affected Environment

Resource	Response to Change	Stresses	Capacity to withstand Stresses	Regulatory Thresholds	Baseline Condition
Water Quality	Increase in chloride concentrations in streams. Increase in erosion and sediment from other development (road, comm., utility, etc.)	New development, salt spray, stormwater runoff, and construction and operation of roadway improvements	The use of BMPs for all project development would minimize pollutant and sediment concentration in runoff. New development plans must incorporate natural drainage measures as well as detention basins designed to reduce runoff and pollutant loads.	All streams fall under the General Use Water Quality Standards. IEPA provides water quality certification under Section 401 of the Clean Water Act, which is mandatory for all projects requiring Section 404 permits. Safe Drinking Water Act protects municipal water sources from contamination.	Stream quality has been steadily improving over the past 15 years. SMC, USACOE, USEPA, LCFPD, and SWCD programs have been improving water quality.
Air Quality	Increase in air pollution	Increase in traffic volumes and congestion	Transportation improvements would reduce congestion and travel time, thereby helping compliance with standards. New technology producing cleaner fuels, and more efficient cars.	National and State Ambient Air Quality Standards, IEPA Construction and Operating Permits	Existing conditions show no exceedance days for particulate, sulfur dioxide, nitrogen dioxide, lead, carbon monoxide, nitric oxide, or VOCs, with the exception of ozone. Heightened public awareness has lead to ozone action days, transit expansion, and non-motorized vehicle initiatives.
Noise	Increase in noise pollution	Increase in traffic volumes and new noise sources	Noise protection measures would be implemented according to IDOT/ISTHA policies.	Refer to Section 2.5, *Noise*	Refer to Section 2.5, *Noise*, and Figure 2-21.
Cultural Resources	Preservation of historic and archaeological resources	Increase in development and transportation improvements	Design considerations that would modify the facility, thereby minimizing or avoiding resource impact. Established programs providing awareness and protection: – IL Main St. Program – Local designations – Statewide inventories – Context sensitive design	Historic and archaeological resources reviewed with the ISHPO in accordance with the requirements of 36 C.F.R 800.4; Section 106 of the Natural Historic Preservation Act; Local/County preservation ordinances	Potentially eligible historical and archaeological resources are located in the study area and near each project alternative.
Threatened and Endangered Species	Impacts to habitats harboring special status plan and animal species	Increase in development and transportation improvements	Design considerations that would modify the facility, thereby minimizing or avoiding resource impact. Streams/rivers would not be impeded thereby allowing wildlife movement along these waterway corridors.	USFWS (under Section 7 of the Federal Endangered Species Act), INDR (under the Illinois Endangered Species Protection Act), IDOT, ISTHA, and Illinois	Bird species represent the majority of listed species in the study area. Urban tolerant species are dominant throughout the County, and species intolerant to urban conditions are concentrated in protected areas.

Threatened and Endangered Species. Listed species and special habitat are improving in protected areas (i.e. nature preserves, forest preserves, etc) of the county. Since the early 1980's appearance of listed species has increased slightly in these critical habitat areas. Advancing development, however, has degraded foraging areas, and fragmented habitat, causing an overall reduction in available habitat. These conditions have resulted in concentrations of listed species in the protected land areas.

Water Quality. Since the early 1990's, water quality in the county's rivers and streams has been improving. For example, the Des Plaines River has shown advancements from low quality to moderate quality. These trends are linked to improved stormwater management practices, and improvements in municipal wastewater treatment. These trends have occurred despite rapid development throughout the county.

Agriculture. About 20 percent of the county is designated for agricultural use. The development in Lake County has been consuming farmland at a rapid rate. Since, 1950, Lake County farmland has decreased by 71%. In the last decade, the county's population has increased by 25%, while farm acreage has declined by 25%, or 20,000 acres (Lake County Department of Planning, Zoning & Environmental Quality 1994). Neither the county nor municipalities have aggressive farmland protection initiatives to slow this trend.

The cause-and-effect relationships **(Step 8)** between the key resources, ecosystems and human communities and the various stress factors identified for the project alternatives are summarized in Table 4-57 (on the following page). The table indicates the response of a given resource to a change in its environment.

The magnitude and significance of negative secondary and cumulative effects **(Step 9)** of the project on the resources in the influence zone are expected to be limited and controllable. Efforts have been made to avoid and minimize impacts, and measures would be implemented to mitigate the loss of resource. The magnitude of effect is discussed for several resource areas under the headings of, "Potential Socioeconomic/Land Use Effects" and "Natural Resource Effects".

Potential Socioeconomic/Land Use Effects. Population and employment have been increasing rapidly in Lake County for the last 3 decades, despite the absence of major transportation improvements. Various factors are propelling this growth; therefore, the continued pace of growth is expected to occur for sometime regardless of whether transportation improvements are made.

Population and employment forecasts for 2020 are only slightly higher for the build alternatives than for the No-Action Alternative (Baseline). As described in Sections 2 and 4, regional population forecasts show that with No-Action Alternative (Baseline), Lake County's population would increase by 54 percent between 1990 and 2020. With the build alternatives, Lake County's 2020 population is forecast to be 3 to 4 percent more than the forecast for the 2020 No-Action Alternative (Baseline). Generally, most of the population difference for the build alternatives over the No-Action Alternative (Baseline) would be localized in the central and north central parts of the county.

Although major transportation improvements would have a small growth impact upon Lake County, these improvements would have some influence on the location of growth, and to some extent, the type of development that would occur. The potential effects of the project alternatives upon the extent and location of this growth are described below.

Under the No-Action Alternative (Baseline), population and employment growth would occur in a manner similar to that of the past three decades. The forecasted population for the No-Action Alternative (Baseline) shows the largest increases in future growth would expand to the west and north central parts of the county—consistent with patterns that have occurred for the past decade and are currently observed today (Figure 4-4). The No-Action Alternative (Baseline), however, rather than

keeping pace with growth, would result in a lower level of transportation service in the county. Over time, this alternative would be unable to serve the needs of this growth, and quality of life factors would likely deteriorate with the area becoming less desirable for residents and business owners alike. Ultimately, increased congestion and decreased accessibility would reach a point of inconvenience and intolerance that would eventually affect development investment and potentially contract the tax base.

Under the IL 53 Freeway/Tollway Alternative, about 60 percent of the additional population (27,500 in the year 2020) would locate primarily in central Lake County (Fremont, Warren, and Shields townships) (Figure 4-5). The added mobility and access provided by this alternative would result in growth concentrations to these areas. However,

TABLE 4-57
Cause-and-Effect for Resources, Ecosystems and Human Communities

Resource	Cause of Change	Potential Effect of Change
Land Use	Growth, accompanied by new transportation, residential, commercial, industrial and service-oriented development	Loss of prime farmland soils. Loss of open land. Shift from rural/suburban to suburban/urban. Increased traffic, congestion and travel times. Increase in infrastructure demand (bus, rail, water, sewer).
Water Resources	New development, with increased impervious surface area Stormwater runoff during construction and operation Stream channel erosion Salt spray and other nonpoint source pollution Human access	Degradation of surface and groundwater. More rapid, higher discharge runoff pattern. Over draught of groundwater. Impaired groundwater recharge rates. Wetland degradation, fragmentation and loss. Disturbance of hydrology. Diminished flood control capacity. Sediment delivery and pollutant loading. Deterioration of recreational water bodies Litter and refuse deposits.
Air Quality	Highway construction, traffic volumes, and congestion	Increased air pollution from vehicle emissions.
Noise	Traffic, human access	Increased noise levels throughout the area.
Cultural Resources	Right-of-way acquisition Streambank erosion Land leveling and construction Vandalism	Cultural site degradation. Fragmentation of historic districts. Development pressure.
Socio-cultural Resources	Right-of-way acquisition Public services	Environmental justice implications for minority and low-income groups residing in higher-density neighborhoods inside the corridor. Disruption of community mobility. Loss of neighborhoods or community character. Traffic noise.
Biological Resources	Highway construction Urban development	Habitat fragmentation and loss outside of protected areas such as nature preserves, natural areas and parks. Impacts to state and federally-listed species known to exist within the Project Corridor. Loss of biological diversity; introduction of pest species. Degradation of sensitive ecosystems. Detrimental effects on food chains.

despite the influence of IL 53 Freeway/Tollway Alternative, this influence zone will experience tremendous growth regardless of transportation improvements. The 1990 population in this influence zone was 100,000, and will increase to 200,000 without transportation improvements. Less than 20,000 new residents are being added by IL 53 improvements in the area of greatest growth. See Figure 4-5.

Lastly, under the IL 83/US 45 with US 12 Alternative, 2020 population is forecast to increase about 18,000 over the No-Action Alternative (Baseline). The townships that would experience the greatest increase in growth would be Warren and Fremont in the central part of Lake County, and Newport Township in the northern part of the county (Figure 4-6). Regardless of the transportation scenario, most of the buildable land in the study area would likely be developed during the next 20 years. However, despite the influence of the IL 83/US 45 with US 12 Alternative, this influence zone will experience tremendous growth regardless of transportation improvements. The 1990 population in the IL 83/US 45's influence zone was 80,000, and will increase to 150,000 without transportation improvements. About 10,000 new residents are being added by the IL 83/US 45 improvements in the area of greatest growth (Figure 4-6).

Based on the population forecasts, transportation plays a small role in the future growth of the county—the build alternatives would increase population by only 3 to 4 percent over the No-Action Alternative (Baseline) by the year 2020. Since transportation and utility infrastructure improvements are already well established in Lake County, there are other factors that play a larger role in the rate and patterns of development in Lake County, including the quality low-density residential living, available and affordable land, a favorable environment for business and commerce, and local land use planning.

The concept of major transportation improvements in Lake County is consistent with regional plans. The current long-range transportation plan for northeastern Illinois, *2020 Regional Transportation Plan*, recommended major transportation improvements, subject to detailed feasibility studies; its predecessor, the *2010 Transportation System Plan*, adopted in 1989, also included major transportation improvements in Lake County as an important element in the regional transportation system.

There are over 50 municipalities in Lake County, and each municipality controls land use decisions in its jurisdiction. Over the years, considerable land use planning has taken place on local, county, and regional levels. Many communities have ambitious plans, whereas other communities show constraint. The regional and county planning efforts, as well as some local community plans, have addressed transportation needs and issues in the county and identify major transportation improvements.

The local plans in Lake County promote contiguous and urbanized growth throughout the southern two-thirds of the county. More than 75 percent of the area surrounding the project alternatives is planned for development by 2020. The remaining 25 percent of the area would be preserved in open space, with some remaining undeveloped lands. The factors affecting growth in Lake County are already well entrenched. Regardless of the transportation alternative selected for the county, the growth pattern is expected to be similar (Section 4.1.1, *Population and Households*). Land management in the county is controlled at the local level, not by state transportation agencies. Municipal governments have the jurisdictional control to provide for orderly development at acceptable levels, and fully recognize that realization of their planning goals requires the support of infrastructure such as transportation. Currently, Lake County and others are making advances toward updating their planning tools. The county is updating their land use plan with an emphasis on concentrating growth in areas with mature infrastructures. Additionally, the county is updating their transportation plan through a coordinated

effort with the LCTIP and other transportation providers. Examples of new development that infill mature areas are regularly occurring, as well as new development that balances housing and environmental resources.

The project alternatives would affect local communities in different ways. Based on the discussion presented above, the local municipality has a considerable number of tools at its disposal to address the potential affects of a transportation improvement within its boundaries. One of the most effective tools could be the creation of a project specific corridor planning council. The corridor planning council would comprise affected communities along a project. These communities would be engaged in a process of developing land use and design guidelines that would address the potential effects of a major highway improvement. Through this mechanism and others, the affected communities would be able to appropriately plan for the integration of a major transportation facility in their communities.

Potential Natural Resources Effects

Development in Lake County, whether it be transportation improvements or commercial and residential development would have secondary and cumulative effects upon the county's natural resources (i.e., wetlands, water resources, biological resources, and agriculture).

Wetlands. The secondary and cumulative effects of the project alternatives upon wetland resources examined past, current, and possible future conditions.

Suloway and Hubbell (1994) estimated that over 90 percent of Illinois's original 3,237,500 ha (8 million ac) of wetlands have been destroyed by human modification. Once, wetlands covered more than 23 percent of Illinois. Currently, wetlands and deepwater habitats now make up only 4.9 percent of Illinois land. Wetland degradation in Illinois and Lake County was historically associated with agriculture; however, recent degradation in Lake County is attributed to urban development.

The Lake County Forest Preserve has estimated that there are slightly more than 18,500 ha (45,700 ac) of wetlands in the county (LCWI). It is estimated that 5 percent of these wetland areas are considered "pristine," (i.e., undisturbed by human activity (Dreher 1992)). Many of the undisturbed, pristine wetlands have been classified in Lake County as ADID.

Biologically, losses of non-ADID wetlands are effectively managed through mitigation. For ADID wetlands, their qualities make it difficult to reproduce these conditions with mitigation. Therefore, there is always special care to avoid or minimize loss of these resources. The alternative development process for the project alternatives took special care to avoid and minimize losses to all wetlands, especially ADID wetlands. However, as the numbers in Table 4-58 indicate, some loss of ADID wetlands are expected for all the project alternatives. Certainly, future steps of project development could further minimize these effects, but the losses shown above represent the best available information.

The percent of wetland loss for each of the project alternatives represent a small fraction of the total LCWI wetland acreage for the county—Table 4-58. From a countywide perspective, it is anticipated that the cumulative loss of wetland acreage (development activities) in the county will slow in the future. More aggressive wetland regulations now require higher mitigation ratios. Under the protection granted to wetlands (Section 404 of

TABLE 4-58
Percent of Lake County Lost per Alternative

Alternative	LCWI Total	ADID Wetlands Total
No-Action	0.17%	0.09%
IL 53 Freeway/Tollway	0.21%	0.06%
IL 83/US 45 with US 12	0.13%	0.03%

the CWA), new mitigation guidelines require wetland losses greater than 0.1 ha (0.25 ac) to be replaced at a ratio of 1.5 to 1 or greater (depending on the type and quality of wetland affected the mitigation ratios may be higher). Thus, in some cases more wetlands are being created than destroyed by an individual project. Additionally, in-kind replacement has been elevated as an objective, which lessens the potential for changing wetland composition in the county. These mitigation requirements are applicable to both private and public projects. The Illinois Interagency Wetland Policy Act of 1989 (applicable to state or state funded projects) also provides protection to wetlands and requires mitigation for all wetland impacts regardless of size. Overall, this legislation has been effective for mitigating the loss of wetlands from public or large private projects, which has helped to slow total wetland loss across the county. The Lake County SMC represents another level of oversight that could help maintain the survivability of wetlands. The SMC has developed a county wetland protection ordinance that would fill potential gaps in State and Federal regulations. Extensive coordination and reviews would be initiated with SMC staff for State sponsored projects that are carried forward in the planning process.

Lake County has been a leader in the state regarding wetland protection with the adoption of the Lake County ADID Program. This program attempts to identify wetlands of the highest quality to avoid impacts to these wetlands. The program, developed cooperatively with the USEPA, NIPC, the Lake County SMC, and regulated by the U.S. Army Corps of Engineers, mandates that developers review options to developing wetlands. If impacts are unavoidable to high quality wetland resources, then higher mitigation ratios are established to offset total acreage and wetland function losses.

Land management is another mechanism that can minimize the potential conversion of special resources. Examples are conservation communities that preserve natural features including farmlands, wetlands, streams and forests. Already existing forest preserves, state parks and natural areas provide long term protection to special resources within their boundaries. In 1998, Lake County voters passed a referendum authorizing the expenditure of $80 million for land purchases to be added to the forest preserve system.

The combination of these practices applied to the wetland losses from the project alternatives, as well as to secondary effects of urban development would effectively slow the rate of wetland loss in the county, and the overall the cumulative effect. The current trends show that these regulations have stabilized the loss of wetlands. The long-term viability of wetland resources will be sustained with rigorous mitigation resulting in an increase in larger wetland complexes (via wetland banks), and a decrease in smaller complexes.

Biological Resources. The most important vegetative cover types for wildlife are the forested lands (20 percent of county land area), rural grasslands (12 percent), and wetlands (11 percent), which includes deep marsh, shallow marsh, shallow water wetlands, and forested wetlands. These cover types provide critical habitat for several native communities in Lake County including prairies, forests, flatwoods, savannas, and in general wetlands. These communities harbor many of the threatened and endangered species in the county.

Forest habitat in Illinois now occupies less than 20 percent of the original presettlement conditions. Within Lake County, a majority of large tracts of wooded areas lie within the boundaries of the Lake County Forest Preserve District or within the three State Park units. Some of these areas support large contiguous tracts of forest habitat along the major stream systems in the county (i.e., along the Des Plaines River), most of which are owned and managed by the Lake County Forest Preserve District. The remaining large tracts of wooded lands are generally located in the less densely developed areas of the county, within the remaining agricultural areas, or along streams and creeks. In the urbanizing part of the county, forested habitat is being

regularly displaced by development leaving small islands of wooded habitat.

Land development is the single largest factor in the disappearance of biological resources. Figure 4-31 shows the critical resources that reside in the project influence zone. East of the Des Plaines River, high quality habitat generally is protected by forest preserve and nature preserve properties. The critical habitat west of the Des Plaines River is less protected, and therefore subject to removal and fragmentation by land development. Resources remaining in this area would be isolated from other habitat areas, and over time, this fragmentation would reduce their habitat function and value.

Cumulatively, the project alternatives and advancing development would fragment habitat west of the Des Plaines River resulting in an environment dominated by urban tolerant species. Less tolerant species would concentrate in protected areas. Establishing a system of connected greenway corridors will help promote the sustainability of these resources.

Water Quality. Development patterns historically have affected the water quality of streams by increased stormwater runoff and wastewater discharges. For example, the water quality of the Des Plaines River has been distressed by pollutants from urban and suburban areas. In 1972, the main stem of the Des Plaines River was designated as severely impaired for half its length within Lake County and moderately impaired for the remaining segment. Water quality violations occurred throughout the Des Plaines River from 1978 through 1983 for dissolved oxygen, ammonia, total dissolved solids, copper, lead, and chlorides. Over the last 10 years, however, water quality in the entire Des Plaines River system has markedly improved, even with sharp increases in population growth.

Table 4-59 summarizes the changing water quality conditions for the Des Plaines River for IEPA's aquatic support classifications. Between 1988 and 1990 over 60 percent of the main stem (Lake, Cook, and Will counties) was classified Partial Support, Moderate Impairment with 13 percent considered Non-Support. In Lake County, roughly 16 km (10 mi) were rated as Full Support and the remaining 39 km (24 mi) Partial Support with half moderate and half minor impairment.

The water quality improved in 1994–1995, with 80 percent of the Des Plaines River classified as Partial Support with only minor impairment. The only Full Support segment occurred in Lake County. The IEPA *Illinois Water Quality Report 2000* indicates 50 percent of the Des Plaines River stem in Lake County is now Full Support, showing further advancements in water quality.

This trend is linked to improved stormwater management, as well as improved wastewater treatment. Development in Lake County is subject to the stormwater management regulation administered by the SMC. The SMC would review a system of compensatory storage and detention to abate the effects of uncontrolled stormwater runoff for the project. The range of state and local regulations are controlling the effects of development upon water resources. Properly applied, water quality throughout the influence area could improve, even with more growth.

Agriculture. In 1997, agricultural lands in Lake County comprised about 20 percent (about 26,306 ha, or 60,060 ac) of the county's total land area (121,687 ha, or 300,800 ac). In

TABLE 4-59
Changing Water Quality Conditions In Des Plaines River (1988–1995)

Year	Full Support (Aquatic)	Partial Support Minor	Partial Support Moderate	Non-Support
1988–1989	9.5%	15.6%	61.6%	13.3%
1990–1991	9.5%	15.6%	61.6%	13.3%
1992–1993	3%	59%	22%	15.6%
1994–1995	3%	80%	17%	0%

recent decades, farmland in Lake County has declined with advancing development. Improving transportation mobility and access could affect development decisions near the project alternatives causing a further reduction in farmlands. The project alternatives would each displace agricultural lands in varying amounts:

- No-Action Alternative (Baseline) would require 32 ha (80 ac) of farmland.
- IL 53 Freeway/Tollway Alternative would require 316 ha (780 ac) of farmland.
- IL 83/US 45 with US 12 Alternative would require 91 ha (226 ac) of farmland.

Clearly, a high percentage of the available land for development in Lake County is agriculture that over time will be displaced by advancing development. Estimates of the current pace of development show that, even without major transportation improvement, lands available for development would be built-out within the next 20 to 30 years. Land development is the single biggest factor in the displacement of farmland resources in the county. With most of the farmlands within the planning and growth boundaries of the 50 municipalities within the county, the sustainability of this resource will be difficult to maintain in the face of advancing development. Development activities throughout the county frequently require wetland mitigation. Farmlands are commonly used as mitigation sites.

The cumulative effect of mitigation, similar to development, is resulting in less farmland. The preservation of farmland can be sustained only with stringent land use policy, outright purchase for open space preservation, or purchase of development rights. The Lake County Forest Preserve District obtained the support of Lake County voters to fund monies for additional land purchases in Lake County. Farmlands contiguous to existing forest preserves or possessing some high quality habitat would be targets for acquisition. These actions combined with others would have some impact on farmland retention.

The right-of-way requirements for the project alternatives comprise commercial/industrial, residential, agricultural, parks/forest preserves, and open lands. When the alternatives were developed, several environmental issues were considered that influenced the location of the improvement **(Step 10).** Among the environmental constraints analyzed were the potential for involvement with Section 4(f) land, avoiding and minimizing the filling of wetlands and floodplains, and avoiding impacts to Section 106 properties eligible for inclusion in the National Register of Historic Places. Other factors affecting the location of improvements were housing and business displacements, severance of prime farmlands, and community interests. The alternatives development process was based on the philosophy of avoidance first, minimization second and mitigation last. Refer to Section 4.12, *Mitigation Concepts and Commitments*, for a discussion of the proposals and concepts for the mitigation of resource losses or managing short-term and long-term social effects.

Monitoring programs for various effects in the influence zone will be developed for the preferred alternative **(Step 11)**.

4.11.2 Conclusion

To conclude, the study area is undergoing rapid population and employment growth. This growth is estimated to continue to year 2020. County and municipal governments within the influence zone have planned for this growth and have adopted land use plans for 80 percent of the area. The remaining lands are protected park and preservation lands.

The project alternatives combined with other local development efforts would act to accommodate growth and development, either present or planned, within the influence zone. The portion of future growth attributable to the project alternatives is low, amounting to about 3 percent of population within the study area in the year 2020. In addition, a number of regulatory mechanisms are already in place to offset or moderate the adverse effects of social and economic growth. Also, the magnitude of

secondary and cumulative impacts for the finalist alternatives are not substantive, and thus would require mitigation commensurate with this relatively low level of impact. The issue of secondary and cumulative impacts will also be examined in further detail for the preferred alternative as part of supplemental studies.

4.12 Mitigation Concepts and Commitments

Mitigative measures are provided to compensate for acknowledged impacts. The following are proposals and concepts for the mitigation of resource losses or managing short-term and long-term social effects.

4.12.1 Traffic

A traffic management plan would be required during the construction period. The purpose of the plan would be to maintain traffic flow and reliable access to residences, businesses, community facilities and services, and local roads during construction. The No-Action and IL 83/US 45 with US 12 alternatives would require considerably more traffic management because of their focus on improvements to existing roadways. The IL 53 Freeway/Tollway Alternative would be largely on new alignment; therefore, management of traffic would be required only at road crossings or in instances where the new improvement would follow existing roadways for short distances. There would be coordination with fire, police, and emergency services to minimize delays and response times during construction.

4.12.2 Community Impacts

Community impact mitigation would consist of maintaining or enhancing connectivity, updating land use plans that reconsider land uses along improved routes, and roadway design considerations for developed and undeveloped areas. The following efforts could be made:

- Maintain existing circulation patterns for vehicular, bicycle and pedestrian movements. Look for opportunities to expand transit, bicycle, and pedestrian movement across or along planned roadway improvements.
- Encourage local municipalities to reexamine land use plans and zoning adjacent to planned improvements to determine future uses most compatible with a high volume roadway environment. Another approach to address related land use issues would be the creation of a corridor planning council comprising affected communities along the project. The council would be engaged in the process of developing land use and design guidelines that would address the potential effects of a major highway improvement.
- Include roadway design considerations, such as noise barriers, landscaping, landscape berms, buffer areas, and roadway lighting sensitive to adjacent land uses, with the improvements to minimize community impacts.

4.12.3 Air Quality

Construction would be required to comply with applicable state and local air quality regulations. The regulation would apply at least to fugitive dust control and open burning of construction debris.

4.12.4 Noise

All construction equipment would be required to have mufflers constructed in accordance with the manufacturer's specifications. Mufflers and exhausts must be maintained in good working order. Daily operating hours for construction would coincide with the construction schedule needs, unless otherwise specified.

Noise abatement measures for reducing traffic noise levels to residential and other properties would be subjected to consideration for reasonableness and feasibility, and follow the guidance provide by the FHWA policies and procedures, 23 C.F.R. 772, the IDOT Noise

Analysis Policy dated April 3, 2000, and the ISTHA Traffic Noise Study and Abatement Policy. Initially, depending on the alternative selected for implementation, specific analyses would be conducted to determine the future noise levels for properties that approach or exceed the FHWA NAC or are predicted to substantially exceed existing noise levels. Traffic impacts would occur when:

- Design-year traffic noise levels exceed the NAC
- Design-year noise levels are within 1 dBA of the NAC
- Design-year traffic noise levels are more than 14 dBA above traffic-generated noise levels

Following the determination of impact, a noise abatement analysis would be conducted at all locations determined to have a traffic noise impact. Noise abatement would be tested at each location for reasonableness and feasibility. The feasibility criteria would be considered as a reduction in sound level of at least 8 dBA, and reasonableness at the receptor would generally be defined as being cost-effective.

Other measures to reduce traffic noise including traffic management measures and shifting the roadway location would be examined on a case-by-case basis.

4.12.5 Cultural Resources

Each project alternative could affect cultural resources of historical or archeological value. During the study, the LCTIP coordinated with the IHPA to discuss the level of study and obtain available information for known resources. The agencies concurred that future work would be required to define cultural resource effects accurately and to appropriate mitigation for the preferred alternative. The additional steps would include the following:

- Coordinate with federal agencies, IHPA, local historic societies, Indian tribes, and other public agencies concerning cultural resources.
- Conduct comprehensive field investigations to identify and locate potentially eligible properties (archeological sites and historic structures), both known and unrecorded.
- Employ detailed roadway design considerations that would avoid or minimize impacts to cultural resources.
- Prepare eligibility documentation for affected sites and structures with historical value, and submit it to SHPO for a determination.
- Determine whether eligible sites comply with agency consultation and documentation requirements
- Develop mitigate measures for sites that are unavoidably affected.

4.12.6 Borrow and Disposal

The requirements for borrow and the amount of unused excavated material have not been determined. These quantities would be addressed after the preferred alternative is selected. The amount and location of borrow cannot be ascertained until preliminary engineering drawings have been developed, and typically during design and construction. Borrow sites would be identified, and a site plan would be prepared including an excavation plan, haul route plan, and end use plan. Appropriate environmental studies would be conducted for the selected borrow areas including an evaluation of the environmental features of the sites and their potential environmental effects.

To the extent possible, cut materials with the proper engineering properties would be used for fill. The contractor would dispose of unusable excavated material in accordance with state and local regulations and other special provisions to ensure protection of wetlands and waterways. All waste and demolition material from the project would also be disposed of in accordance with the applicable regulation.

4.12.7 Water Quality and Hydrology

Proper erosion control measures would be employed to minimize erosion and sedimentation for any project alternative. These measures are a condition of the Section 404 Permits, prescribed in design and construction guidance by IDOT and ISTHA, and should be coordinated with the local Soil & Water Conservation District (SWCD). Erosion control devices would be installed before commencing construction that could cause erosion. Temporary or permanent erosion control measures to be used would include such measures as silt fencing, sediment basins, detention basins, interceptor ditches, seeding and sodden, rip-rap on exposed banks, erosion mats and mulching. Disturbance of stream vegetation would be kept to a minimum. Construction activities near special or sensitive streams would be conducted during low or normal flow periods if necessary.

Stream crossings and structure sizing would be performed in accordance with state and federal guidelines regarding floodplain encroachment and hydraulic capacity. All new structures would comply with these guidelines. Drainage systems, including ditches and farm drain tiles, would be maintained and restored in a manner that would not impound water. Compensatory storage and stormwater detention facilities would be considered in the design of the facilities and would be reviewed by the Lake County Stormwater Management Commission. The requirements for both compensatory storage and detention are enumerated in Section 4.3.3, *Wetlands*. A conceptual plan for satisfying these requirements is presented in Appendix D.

Other stormwater management practices, known as BMPs, may be needed to mitigate potential water quality impacts. In addition to detention facilities, other BMPs, such as vegetated strips, would be evaluated to minimize transport of sediment and heavy metals. Deicing management practices, such as anti-icing and additives, can also minimize salt application quantities. Further evaluation of these practices would be included in future work on the preferred alternative.

Accidental spills of hazardous materials and wastes during construction or operation of the facility would require special response measures. These occurrences would be handled in accordance with local government response procedures. The first response typically is through the fire department and emergency service personnel to ensure public safety and to prevent harm to the environment. Depending on the nature of the spill, IDNR and IEPA would be notified to provide additional instructions regarding cleanup. Refueling or maintenance of construction equipment would not be allowed within 30.5 m (100 ft) of wetlands or water bodies to avoid other accidental spills.

4.12.8 Biological

4.12.8.1 Upland Forest and Prairie Loss

Mitigation of upland prairie and forested areas should comply with guidelines established by the IDOT for habitat replacement. For effected upland prairies, mitigation efforts would include:

- Reestablishing in-kind upland prairies, with an emphasis on replacement occurring in wetland buffer zones
- Relocating the topsoil and seed bank, reseeding in kind, and transplanting sod and individual plants
- Planting native prairie vegetation within roadside right-of-way

Tree replacement would be in accordance with IDOT's Tree Removal and Replacement Policy. Guidelines for tree and vegetation replacement include:

- Replacing losses of forest habitat associated with large wooded tracts (4 ha [10 ac] or more)
  - Replacing existing native hardwoods
  - Replacing adventive species with native hardwoods

  - Replacing indigenous understory
- Replacing losses for other tree and vegetation material
  - Replacing scattered landscape material in accordance with IDOT's Guidelines for Use of Landscape Items
  - Replacing trees and vegetation on Section 4(f) lands to be coordinated with the agency having jurisdiction over the subject property

An attempt would be made to minimize and mitigate impacts to wildlife. For large parts of both the No-Action Alternative (Baseline) and the IL 83/US 45 with US 12 Alternative, the proposed improvements are primarily to existing roadways. These roadways are, for the most part, limited barriers to wildlife movement.

As streams provide avenues of wildlife movement, bridges or open bottom culverts can be installed where practical to provide additional corridors of movement for smaller wildlife.

Roadside barriers, such as fences and jersey walls, may restrict wildlife from entering roadways. They can also trap wildlife that enter the roadway, allowing no avenue of escape. In areas where large numbers of wildlife are present, such as forest preserves, fencing and other barriers will be limited to areas necessary for public safety. For project segments that are new roadways or new alignments, features to facilitate wildlife movement and reduce vehicle/wildlife collisions will be incorporated into the plans where possible.

Larger stream crossings in the IL 53 Freeway/Tollway Alternative will be bridged along with parts of the floodway. These stream corridors will remain open for wildlife movement.

For sensitive wildlife areas, such as forest preserves, prairie remnants, and ADID and general wetlands, large box culverts can be installed where practical to serve as avenues for wildlife movement. The placement of culverts would be most critical for areas where a wildlife habitat area is bisected by new roadways. Culverts combined with low barrier walls along the roadway will provide a safer means of crossing the roadway.

Short barrier walls in sensitive areas would be designed mainly to restrict the movement of small animals, including reptiles, amphibians, and smaller mammals. The walls would not limit the movement of larger mammals in order to prevent them from being trapped within the roadway. IDOT is proposing snake barriers as a mitigative option for proposed improvements to Willow Road in Cook County to mitigate impacts to Massasauga rattlesnakes that may result from roadway operations (IDOT 1999). Similar devices would be included where practical.

These features would be most critical in areas that may harbor threatened or endangered species near the roadways.

Threatened and Endangered Species. All alternatives could affect the Iowa darter fish species near the interchanges of IL 21 and IL 120. IDOT has already committed to providing mitigative measures for programmed proposed improvements to IL 21. Such measures would be incorporated into the plans for the selected preferred alternative. Section 4.3.6.1 provides specific details of this mitigation plan.

The ISTHA has developed a mitigation plan, coordinated through IDNR, for potential impacts to the endangered seaside crowfoot plant found near the former Deerfield Toll Plaza. Proposed improvements to I-94 proposed must recognize the potential presence of the plant. If encountered, a mitigation plan will be developed similar to the plan that met requirements of IDNR for the Deerfield Toll Plaza area.

Detailed surveys of fauna and flora would be conducted after the selection of a preferred alternative. If threatened or endangered species are encountered that have not yet been recorded, a plan would be developed to avoid affecting the identified species. If avoidance is impractical, a mitigation plan would be

developed, and coordinated with either the U.S. Fish & Wildlife Service or the IDNR through the formal consultation process.

Plans for staged construction may be incorporated into the final plans for the selected alternative to minimize disruption of breeding seasons for sensitive species.

4.12.9 Wetland Mitigation

The overall concept for wetland mitigation would incorporate avoidance and minimization, establishing wetland compensation objectives, applying established ratios for compensation commensurate with proposed impacted wetlands, identifying locations for wetland compensation sites, and adopting plans for long-term monitoring and maintenance of replacement wetlands. Each action is described below.

4.12.9.1 Avoidance and Minimization

The first step of the process would focus on further efforts to avoid and minimize effects to wetland resources. The LCTIP has rigorously applied such practice to wetland resources during the development of alternatives. Recognizing the conceptual engineering detail of the project alternatives, further efforts can be made in future phases of work for the preferred alternative to avoid and minimize additional wetland effects. Avoidance and minimization can be accomplished in the following ways:

- Alignment shifts of roadways
- Narrower roadway cross-section with the use of:
  - Narrower center median
  - Narrower shoulder
  - Retaining walls
  - Steeper roadway embankments
  - Enclosed drainage systems
- Bridging critical wetland resources

Avoiding or minimizing disruption to wetland resources may be constrained by other critical resources or local issues. In some cases, when a choice must be made between wetlands and other critical resources, some resources or project issues may be afforded priority over wetland loss. Examples include:

- Avoidance of public recreational lands protected under Section 4(f)
- Avoidance of nature preserves
- Avoidance of threatened or endangered species
- A disproportionate amount of residential and business relocations
- Maintenance of minimum safety requirements

4.12.9.2 Wetland Compensation Objectives

The objectives for mitigation would be established jointly by the project's sponsoring agencies and resource agencies with attention to the following major issues:

- Type
  - In-kind replacement
  - Functional replacement
- Ratio for replacement
- Location for replacement

Ratios For Compensation. Wetland compensation ratios have been established by the State of Illinois in the Interagency Wetland Policy Act (IWPA) for all state-funded projects. These established ratios are generally more stringent than those established by the U.S. Army Corps of Engineers (Table 4-60, on the following page). The highest mitigation ratio of 5.5:1 would apply for the following:

- Alteration of wetlands that contain state or federally-listed threatened or endangered species
- Wetlands that contain essential habitat for state or federally-listed species
- Presence of an INAI site
- A mean C value of 4.0 or more (Swink and Wilhelm 1994)
- Individual wetlands with a Floristic Quality Index (Swink and Wilhelm 1994) of 20 or more

The compensation ratios shown in Table 4-60 represents the current compensation guidelines required for wetland impacts in Illinois by the IWPA; however, Lake County has instituted the USEPA's ADID wetland program. Compensation ratios for ADID wetlands would be developed with the regulatory agencies on a case-by-case basis.

Location of Wetland Mitigation. The location of the compensation sites would be determined following agreement on wetland replacement ratio and other mitigation objectives. Appropriate environment studies would be conducted for the selected mitigation site including an evaluation of the environmental features of the site and potential effects. The environmental studies would include historic/archaeological surveys, biological surveys, and potential for threatened and endangered species. Preferences for mitigation are as follows:

- Onsite—within 1.6 km (1 mi) of the project
  - One overall compensation site
  - Multiple large to medium sites
  - Participation in ongoing wetland creation programs (i.e., Lake County Forest Preserve)
  - Scattered sites (small) in proximity to wetland impacts
  - Restoration and enhancement of existing wetlands
  - Acquisition/land protection
- Offsite, within basin—areas greater than 1.6 km (1 mi)
- Offsite, out of basin—compensation not provided within the watershed of affected wetlands.

4.13 Permits/Certifications

4.13.1 Permits/Certifications

Regulatory permits are required under any project alternative selected. Regulatory agencies, such as the U.S. Army Corps of Engineers, are not being requested to consider the granting of 404 permits or other permits at this time. Supplemental studies would be required, at a corridor level of detail, as part of formal consultations regarding permits. Such studies would include formal wetland delineation, biological surveys, and surveys of threatened and endangered species for the selected alternative. The agencies are being asked to review the planning process and the environmental consequences of the project alternatives and to render any comments germane to the process or the environmental consequences associated with the finalist alternatives. Issuance of permits by the agencies would require detailed engineering for the preferred alternative. This study does not include the development of the detailed engineering plan for any alternatives. Therefore, submittal of permit applications to all pertinent regulatory agencies would not occur until after the selection of a preferred alternative and the development of final engineering plans. Avoidance and

TABLE 4-60
Wetland Compensation Ratios (IWPA)

Degree of Adverse Impact	Onsite	Offsite	Out-of-Basin
Minimal Alteration	1.0:1[a] / 1.5:1[b]	1.5:1	2.0:1
Significant Alteration	1.5:1	2.0:1	3.0:1
Destruction	2.5:1	4.0:1	5.5:1

[a]This ratio applies to all other types of wetland vegetation, substrate, or wetland type except those wetlands that have woody vegetation, subject to Corps approval.
[b]This ratio applies if the vegetation of the affected wetland is woody.

minimization strategies required under permit conditions would be developed at that time. Permits could include:

- Section 404 (individual permit) of the CWA from U.S. Army Corps of Engineers
- Section 401 (CWA) Water Quality Certification from the IEPA
- Section 10 of the Rivers and Harbors Act of 1899 from U.S. Army Corps of Engineers and the U.S. Coast Guard
- NPDES permit from the IEPA
- Illinois Department of Natural Resources–Office of Water Resources (IDNR-OWR) permits for impacts to regulatory floodways and stream crossings
- IHPA approval under Section 106 of the National Historic Preservation Act (1966)
- Coordination with McHenry Soil & Water Conservation District (SWCD) for soil erosion and sediment control
- Coordination with Lake County SMC for project compensatory storage, stormwater detention, and wetland mitigation (This would be applicable only to projects implemented by local agencies under the No-Action Alternative (Baseline). State projects under the No-Action Alternative (Baseline) would coordinate with local agencies but are not required to meet the guidelines of the Lake County SMC.)

Each project alternative would involve water bodies and wetlands. The discharge of dredge or fill materials into waters of the U.S., including jurisdictional wetlands, would be subject to requirements of Section 404. The permitting process for the build alternatives would vary depending on their implementation as either a single project or a phased project. Assuming either build alternative is implemented as a single project, an Individual Permit would most likely be required from the U.S. Army Corps of Engineers Chicago District for all wetland effects associated with the project. Should the build alternatives be phased or implemented over time as several projects, the likely regulatory scenario would be an Individual Permit for each separate project. It is assumed that the No-Action Alternative (Baseline) would be implemented by various entities as individual projects overtime and that separate Individual Permits would be required for each project involving wetlands as they are implemented under the No-Action Alternative (Baseline). For some projects, however, wetland effects may be minimal, and would qualify for the Regional Permit Program within the Chicago District.

The Section 404 permit is contingent upon receipt of a 401 Water Quality Certification from the IEPA. IEPA provides water quality certification pursuant to Section 401 of the CWA. Each of the project alternatives would be subject to the requirements of Section 401 Water Quality Certification.

A recent cooperative agreement between the Corps of Engineers and the local SWCDs requires a detailed review of erosion and sediment control in conjunction with Section 404 permitting. In Lake County, a compliance review would be conducted by the McHenry County SWCD. Each project alternative would be required to prepare and submit a Soil Erosion and Sediment Control Plan for review and approval during the Section 404 permitting phase. The recommendations provided in the Soil Erosion and Sediment Control Plan would require implementation and periodic inspection.

Each project alternative would disturb more than 0.4 ha (1 ac) of land area. Accordingly, they are subject to the requirements of an NPDES permit for stormwater discharges from the construction site. Permit coverage would be obtained either under the USEPA general permit for stormwater discharges from construction site activities, or under an individual NPDES permit. Requirements applicable to such a permit would be followed, including preparation of a stormwater pollution prevention plan. Such a plan would identify potential sources of pollution that may reasonably describe and ensure the implementation of practices that would be used to reduce the pollutants in discharges

associated with construction site activity and to assure compliance with terms of the permit.

The OWR issues permits for work within regulatory floodways and for the crossing of streams with more than 259 ha (640 ac) of drainage area. Each project alternative would require issuance of this permit. The involvement of stream floodways and floodplains for each alternative as described under Section 4.3.3, *Wetlands.*

The Corps of Engineers defines the Des Plaines River as navigable throughout its course (Public Notice, April 22, 1983). Each project alternative would improve crossings of the Des Plaines River. Under Section 10 of the River and Harbors Act of 1899, any crossing of a navigable water body requires Section 10 Permits from the Corps of Engineers. Under the Section 10 Permit, a review by the U.S. Coast Guard is required. All three alternatives would require Section 10 permits in conjunction with Section 404 permits issued by the Corps.

The NRCS reviews projects involving farmlands to determine if farmed wetlands would be affected. Each project alternative would be assessed to determine the presence of farmed wetlands. The NRCS would coordinate with the Corps of Engineers regarding the issuance of Section 404 permits if farmed wetlands are affected by any project alternatives.

The SMC administers stormwater controls throughout the county. The SMC criteria would be applicable to projects implemented by local county, township, or municipal agencies under the No-Action Alternative (Baseline). Although an SMC permit would not be required for State sponsored projects under the No-Action (Baseline) and Finalist Alternatives, extensive coordination and reviews would take place with SMC staff for alternatives carried forward.

4.14 Relationship of Short-Term Uses versus Long-Term Productivity

This section examines the short-term costs and long-term gains for the project alternatives. The short-term costs of land, human capital, financial, and energy resources would be realized as long-term benefits to the traveling public. The long-term benefits would include improvements in travel time, regional travel, traffic congestion, and safety.

4.14.1 Short-Term

The project alternatives have varying short-term costs, with the build alternatives requiring a greater commitment of resources than the No-Action Alternative (Baseline). Overall, the IL 83/US 45 with US 12 Alternative would require the greater investment of resources.

Land would be removed under the project alternatives as follows: 482 ha[11] (195 ac) under the No-Action Alternative (Baseline), 513.1 ha (1,268 ac) under the IL 53 Freeway/Tollway Alternative, and 248.1 ha (613 ac) under the IL 83/US 45 with US 12 Alternative from (Section 4.1.2, *Community and Land Use Changes).*

Roadway improvements can divide existing land use patterns, bring a community more tightly together, or guide future community growth and development. Carefully planned improvements can foster beneficial results, such as making the community more cohesive and serving future growth and planning policies. Lack of planning, however, can have undesirable results, such as fracturing community cohesion. The discussion below describes the potential effects of each alternative on community cohesion.

[11]New right-of-way required.

4.14.1.1 No-Action Alternative (Baseline)

Improvements under the No-Action Alternative (Baseline) would traverse 30 communities within Lake County. Generally, the alternative maintains the present roadway network and would have a minimal change on community function. The roadway network would continue to define circulation patterns for entering, leaving, and traveling within the communities. The edge of the roadway improvements would encroach on adjacent properties and, in some cases, displace buildings. The number of displacements would be small enough that the character of community building stock would not change. Road widening typically would maintain property access, but barrier medians would be installed as part of many roadway improvements, requiring access to be consolidated for some properties. Most individual parcels would not get a median break and would be limited to right-in, right-out access. For some land use types and cross streets, a break in the median generally would be provided to allow left-turn access. In some instances, construction of a wider roadway could become a physical barrier, when it may not have been before upgrading. In such cases, the roadway becomes more of a barrier to bicycle or pedestrian movement.

4.14.1.2 IL 53 Freeway/Tollway Alternative

This alternative would traverse 15 communities. The proposal to extend IL 53 north and upgrade IL 120 has been part of the region's long-range transportation plan since 1960; therefore, many communities in the vicinity of this alternative have had the opportunity to consider and plan for compatible land uses adjacent to the proposed facility. In cases where properties are already developed adjacent to the proposed improvement, facility design considerations could be developed to reasonably protect these areas from typical highway related concerns (i.e., noise and visual concerns). These design considerations could include noise barriers, landscaping, landscape berms, buffer areas, roadway lighting sensitive to adjacent land uses, etc. In cases where that land is undeveloped, additional care in planning and zoning should be exercised to provide for land use patterns that best fit the presence of a major transportation facility. This could include locating the most traffic intensive uses near the corridor or at interchange locations, while the suburban land uses would extend away from the corridor. With well-managed land use policy and plans, this alternative could have the distinct advantage of accommodating growth with quality development.

A major transportation facility, such as the IL 53 Freeway/Tollway Alternative, represents a new land use element for the communities in central Lake County. The scale of the facility by itself establishes new borders in the community that tend to define community or neighborhood edges. The perception of a barrier, however, would not alter travel patterns within the community. The circulation pattern that exists on the local roadway system today would be maintained (crossing over or under the new facility) for vehicles, bicycles and pedestrians, as well as emergency services and school bus routes. Therefore, the roadway connectivity that exists in the communities today would continue to be present with this alternative. Major projects such as the IL 53 Freeway/Tollway Alternative also present opportunities for enhancing nonmotorized movement, which tend to reduce the barrier effect. These enhancements could include shared bicycle and pedestrian paths along and across the facility with direct and indirect access to existing paths and community nodes.

4.14.1.3 IL 83/US 45 with US 12 Alternative

This alternative would traverse 21 communities, and improvements would occur on both existing and new alignments. Improvements on existing routes typically would have a 6-lane cross-section that would displace residential and commercial structures.

Bypasses were incorporated along routes US 45, IL 21, IL 60, and IL 120 to avoid community impacts in downtown Mundelein

and Libertyville, through the Diamond Lake area (a residential area), and through a commercial corridor in Grayslake. In all four locations, through-town improvements would be unacceptable because of the disruption and change in character that widening would cause. Bypasses were selected to minimize displacements and community disruption while providing additional capacity to the system and helping to relieve congestion on parallel existing routes.

In terms of construction related jobs, the project alternative would generate 3,300 jobs with the No-Action Alternative (Baseline), 6,600 jobs with the IL 53 Freeway/Tollway Alternative, and 7,200 jobs with the IL 83/US 45 with US 12 Alternative (Section 4.10, *Construction Impacts*). It would cost $338 million[12] to construct the No-Action Alternative (Baseline), $674 million to construct the IL 53 Freeway/Tollway Alternative, and $735 million to construct the IL 83/US 45 with US 12 Alternative. These project expenditures would induce additional employment in the county and the region from wage and salary respending.

Energy would be consumed during the construction of the proposed improvements and by motorist during the construction period (i.e., construction delay). The number of proposed improvements and the time required for completion would have a corresponding affect on the fossil fuels consumed. The energy consumed would generally be proportional to the number of lane miles of improvement associated with each alternative. Accordingly, the IL 83/US 45 with US 12 Alternative would require more energy consumption for construction than the other alternatives.

4.14.2 Long-Term

The alternatives provide long-term travel benefits. The No-Action Alternative (Baseline) would double congestion over the next 20 years, resulting in travel delays and associated cost. The build alternatives, however, would reduce travel times, travel delay, and overall transportation costs (Section 3.6.2, *Detailed Evaluation of the Finalist Roadway Alternatives*). Both build alternatives would provide substantial travel time savings over the No-Action Alternative (Baseline).

The IL 53 Freeway/Tollway Alternative annually would save 18.7 million hours in travel time over the No-Action Alternative (Baseline), and the IL 83/US 45 with US 12 Alternative 19.1 million hours of travel time. The IL 53 Freeway/Tollway Alternative would provide greater regional travel benefits than both the IL 83/US 45 with US 12 Alternative and the No-Action Alternative (Baseline) in terms of providing improved travel time to a greater regional area. The IL 53 Freeway/Tollway Alternative would also provide an additional link in the regional highway system, thereby accommodating more direct travel, as well as redistributing traffic from other congested segments of the system.

The IL 53 Freeway/Tollway Alternative would provide 596 lane miles of uncongested north-south travel, 66 more lane miles than the No-Action Alternative (Baseline). The IL 83/US 45 with US 12 Alternative would provide 568 lane miles of uncongested north-south travel, 38 more lane miles than the No-Action Alternative (Baseline).

Compared to the No-Action Alternative (Baseline), the IL 53 Freeway/Tollway Alternative would improve safety by 7 percent greater safety, the IL 83/US 45 with US 12 Alternative by roughly 1 percent.

4.15 Irreversible and Irretrievable Commitments of Resources

The proposed project alternatives would require a commitment of natural, physical, human, and fiscal resources that would constitute an irretrievable and irreversible loss.

[12] Construction cost only; does not include right-of-way cost.

A discussion of those commitments is provided below.

4.15.1 Land

Land acquired to construct the project would be an irreversible commitment during the time the land is used as a highway. Right-of-way requirements would convert land from residential, agricultural, commercial, and natural environmental resource uses. The commitment of land would be 195 ha (482 ac) for the No-Action Alternative (Baseline), 613 ha (248 ac) for the IL 83/US 45 with US 12 Alternative, and 513 ha (1,268 ac) for the IL 53 Freeway/Tollway Alternative. The direct use of land would be lost to future development, residential, commercial, or open space. The growth inducing effects of the project alternatives upon land use within the study area is subject to speculation. Factors other than improved access weigh heavily in the growth trend for Lake County (Section 4.1.2, *Community and Land Use Changes*).

4.15.2 Raw Materials

Considerable amounts of fossil fuel, labor, and highway construction materials, such as steel, cement, aggregate, and asphalt material, would be required. In addition, considerable labor and natural resources are used in fabricating and preparing construction materials. Those resources generally are irretrievable, but their use would not have a substantial adverse effect on continued availability. Of these resources, the IL 83/US 45 with US 12 Alternative would require the largest commitment, followed by the IL 53 Freeway/Tollway and No-Action Alternative (Baseline)s.

4.15.3 Human Resources

Human energy would also be an irretrievable commitment of resources to the design and construction of the project alternatives. Human effort, expressed as person-hours or person-years of labor, can be categorized as:

- Engineering effort for design and construction
- Construction effort
- Effort expended to maintain and operate the preferred alternative after completion

4.15.4 Economic

Construction of a build alternative would involve irretrievable federal, state, and local funding. Although the fiscal commitments are large, they reflect the commitment to improve travel not only in Lake County but also in the Chicago Metro area. The No-Action Alternative (Baseline) would cost $483 million to construct, the IL 53 Freeway/Tollway Alternative $861 million, and the IL 83/US 45 with US 12 Alternative $1.095 billion (in 1999 dollars) minus right-of-way costs. Land converted from private to public use would displace local tax revenue.

4.15.5 Natural

The effort made throughout the LCTIP process to avoid and minimize impact to natural resources resulted in relatively low levels of impact to natural resources, considering the rather sizeable improvements proposed. The alternatives would, however, affect natural resources to a varying extent including: wetlands, parks/forest preserves, threatened and endangered species land, cultural sites, agricultural land, and undeveloped land. See Table 4-61 (on pages 4-99 and 4-100) for a summary.

The basis for committing resources is founded on the concept that residents in the study area, region, and state would benefit from the improved capacity and safety that would result from the proposed improvements. The benefits such as reduced commuting times, improved access to businesses and community services and increased safety are expected to outweigh the commitment of resources in the long term.

4.16 Summary of Environmental Consequences

Table 4-61 summarizes the environmental effects of the No-Action Alternative (Baseline) and the two build alternatives.

These effects would be minimized as much as possible with the use of appropriate design techniques and considerations, construction methods, and mitigation measures as discussed in this document and companion technical reports.

TABLE 4-61
Summary of Environmental Consequences

	No-Action	IL 53 Freeway/Tollway	IL 83/US 45 with US 12
Cost (1999 dollars)	$483 million	$861 million	$1.095 billion
Socioeconomic Impacts			
Population (2020)	796,942	27,500 more people over No-Action[a]	18,000 more people over No-Action[a]
Households (2020)	290,570	10,962 more households over No-Action[b]	7,640 more households over No-Action[b]
Employment (2020)	389,545	4,444 more jobs over No-Action[b]	4,200 more jobs over No-Action[b]
Community and Land Use Changes	No change to community function, or the pattern of future land development.	Since the early 1960's the communities have considered the potential for a major new highway in central Lake County; and therefore have been able to plan for its potential change to land use.	No material change in community function, or pattern of future land development.
New Right-of-Way[c]	195 ha (482 ac)	513 ha (1,268 ac)	248 ha (613 ac)
Residential Relocations (Additional Ancillary Outbuildings associated with Residential Relocations)	67	113 (45)	187 (25)
Business Relocations	23	9	195
Parking Impacts (# of displaced parking spaces)	—[d]	109 (0)	2,514 (258)
Percent of Total Assessed Value Converted	0.20	0.30	0.47
Environmental Justice	No disproportional impact	No disproportional impact	No disproportional impact
Public Services and Facilities	0	0	9
Agricultural Impacts			
Direct Farmland Impacts	32 ha (80 ac)	315 ha (780 ac)	91 ha (226 ac)
Market Value of Affected Crops	$21,000	$205,000	$59,300
Farm Operations	Minimal effect	36 farm parcels	20 farm parcels
Natural Resources			
Wetlands (all direct impacts)	32 ha (78 ac)	37 ha (92 ac)	23 ha (58 ac)
ADID Wetlands	5 ha (13 ac)	4 ha (9 ac)	2 ha (4 ac)
Class I	—[e]	5 ha (12 ac)	1 ha (2 ac)
Class II	—[e]	10 ha (25 ac)	14 ha (35 ac)

TABLE 4-61 CONTINUED
Summary of Environmental Consequences

	No-Action	IL 53 Freeway/Tollway	IL 83/US 45 with US 12
Class III	—[e]	23 ha (56 ac)	8 ha (20 ac)
Floodplain Impacts	38 FIS floodplains	10 FIS	33 FIS
Longitudinal Encroachments	9	0	12
Transverse Encroachments	1	12	17
Threatened and Endangered Species	1	1	1
Water Quality	Does not exceed criteria	Does not exceed criteria	Potentially exceeds chloride standard
Air Quality	Does not exceed criteria	Does not exceed criteria	Does not exceed criteria
Noise	1,211 residential structures[f]	417 residential structures[f]	273 residential structures[f]
Potential Section 4(f) Resources Cultural Resource Impacts			
Historic Structures	13[g]	3	6
Archaeological Sites	10	4	2
Potential Forest Preserve and Local Park 4(f) Impacts (area)	7 ha (17 ac)	8 ha (20 ac)	8 ha (19 ac)
Potential Forest Preserve and Local Park 4(f) Impacts (number of properties)	22	5	19
Special Waste			
CERCLIS	0	0	0
LUST	20	3	34

Note: For purposes of a summary, all area values are rounded to the nearest whole number. Impacts are summarized individually for each alternative.

[a] Represents additional population for roadway improvements only.
[b] Represents additional households for both roadway and transit improvements.
[c] Includes new right-of-way requirements only—use of existing right-of-way would be associated with each alternative.
[d] Parking displacements were not investigated for the No-Action Alternative (Baseline).
[e] No field verification of wetlands performed for No-Action Alternative (Baseline), therefore, no qualitative assessment completed.
[f] Structures near the proposed improvements that would exceed the noise abatement criteria for residential areas—does not include those that would be displaced.
[g] Based on available Phase 1 preliminary engineering and environmental documentation reports.